

# STORM DATA



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*Kenneth D. Walden*

DIRECTOR  
NATIONAL CLIMATIC DATA CENTER

**noaa**

NATIONAL OCEANIC AND  
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## C O N T E N T S

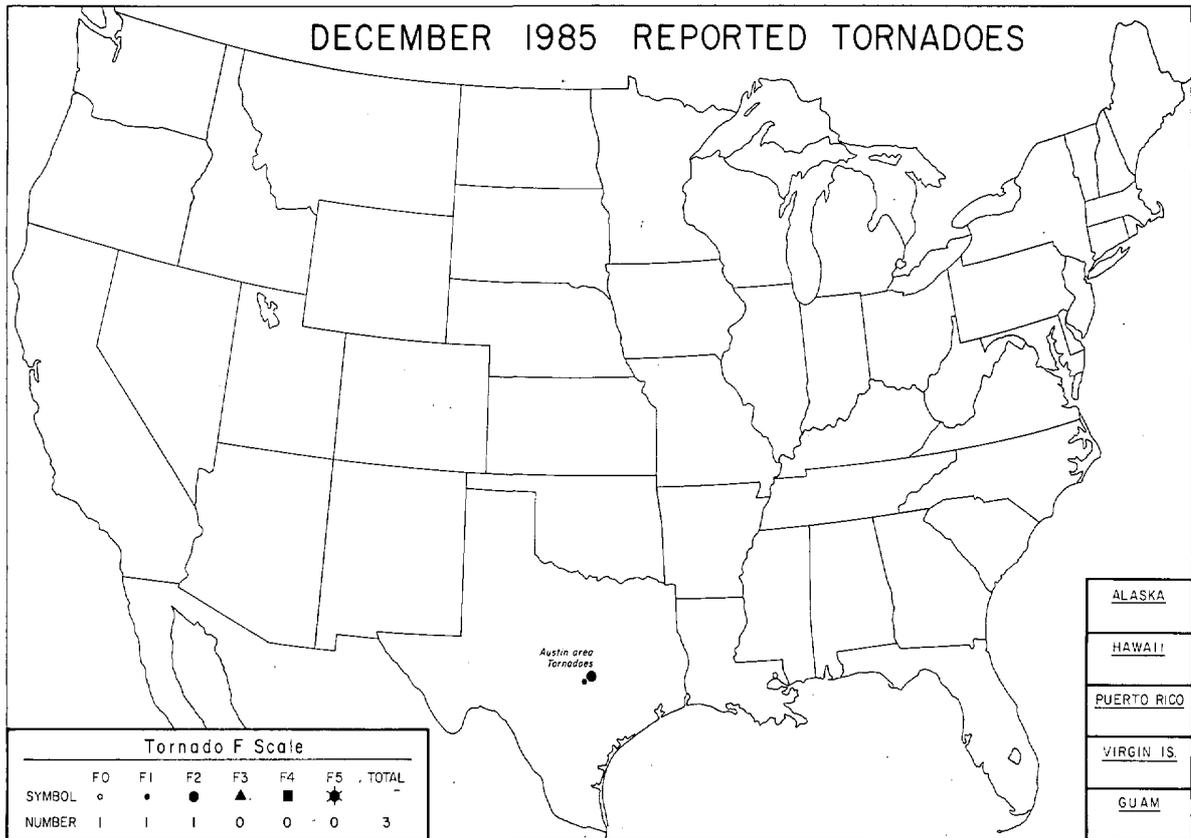
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Cover: Water from waves on Lake Superior formed an icy coating over this lakefront residence in Marquette, Michigan as a winter storm brought high winds and heavy snow to the area on November 30th and December 1st (see SNOWSTORM in the UPPER MIDWEST, pages 5 through 8). ---Photo by Linda Szilagyi, The Mining Journal, Marquette, Michigan.

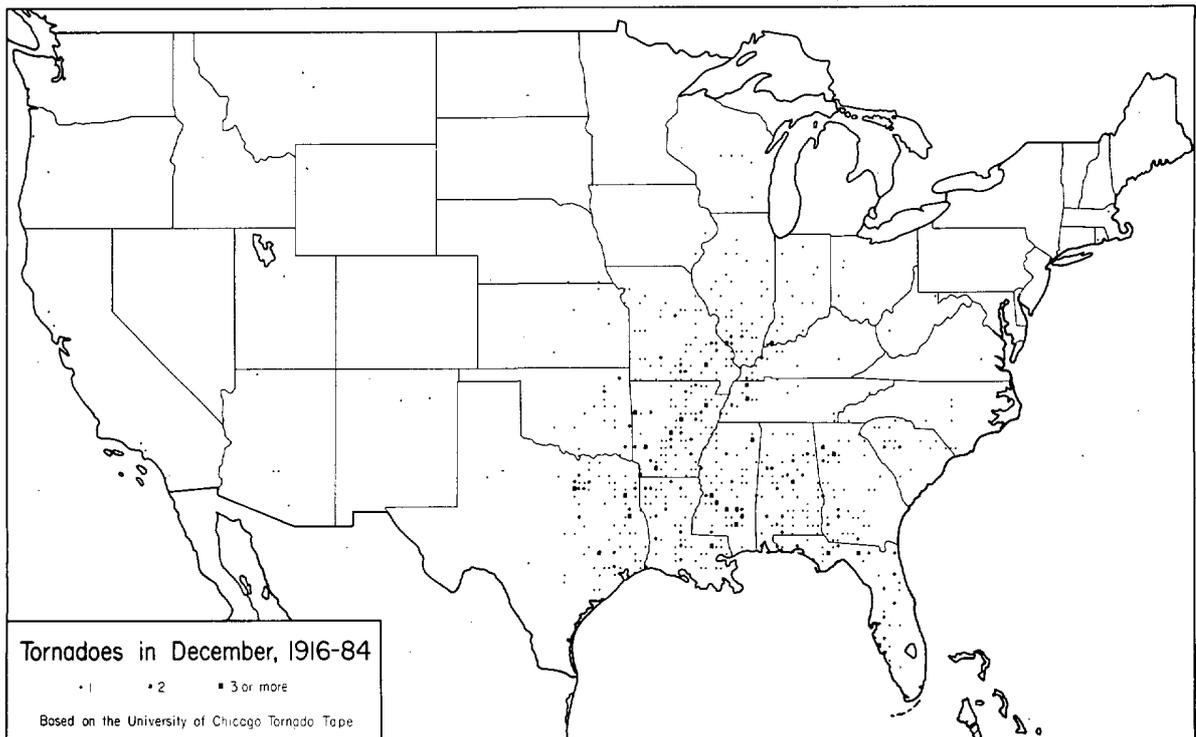
NOTE: The section on Outstanding Storms of the Month is prepared by Professor T. Theodore Fujita, editor, and Duane J. Stiegler, associate editor, University of Chicago. The narrative descriptions of Storms by State and Summaries of Hurricanes and Tropical Storms are prepared by the National Weather Service. The National Climatic Data Center compiles the statistics on deaths, injuries, and damage. 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.

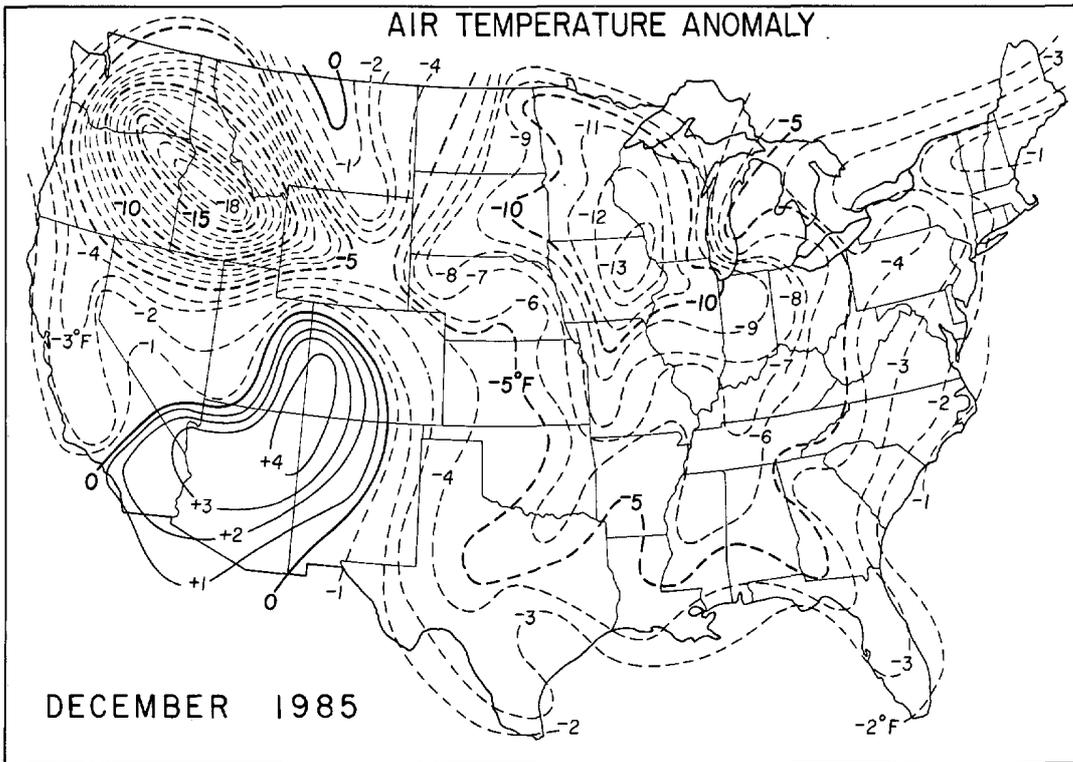
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# OUTSTANDING STORMS OF THE MONTH



<ul style="list-style-type: none"> <li>● COMPLETE REPORT RECEIVED</li> <li>○ PRELIMINARY REPORT RECEIVED</li> <li>○ REPORT NOT RECEIVED</li> </ul> <p>(N) northern (W) western                      (S) southern (C) central                      (E) eastern (O) coastal                      (SE) southeastern</p>	<table style="width: 100%; border: none;"> <tbody> <tr> <td>● 1AL</td><td>● 7DE</td><td>● 14KS</td><td>● 21MN</td><td>● 28NJ</td><td>● 33OH</td><td>● 39SD</td><td>● 44VA</td><td>● 49AK(SE)</td></tr> <tr> <td>● 2AZ</td><td>● 8FL</td><td>● 15KY</td><td>● 22MS</td><td>● 29NM</td><td>● 34OK</td><td>● 40TN</td><td>● 45WA</td><td>● 50HI</td></tr> <tr> <td>● 3AR</td><td>● 9GA</td><td>● 16LA</td><td>● 23MO</td><td>● 30NY(O)</td><td>● 35OR</td><td>● 41TX(N)</td><td>● 46WV</td><td>● 51PR</td></tr> <tr> <td>● 4CA(N)</td><td>● 10ID</td><td>● 17ME</td><td>● 24MT</td><td>● 30NY(C)</td><td>● 36PA(E)</td><td>● 41TX(S)</td><td>● 47WI</td><td>● 52VI</td></tr> <tr> <td>● 4CA(S)</td><td>● 11IL</td><td>● 18MO</td><td>● 25NE</td><td>● 30NY(W)</td><td>● 36PA(W)</td><td>● 41TX(W)</td><td>● 48WY</td><td>● 53PC</td></tr> <tr> <td>● 5CO</td><td>● 12IN</td><td>● 19MA</td><td>● 26NV</td><td>● 31NC</td><td>● 37RI</td><td>● 42UT</td><td>○ 49AK(N)</td><td></td></tr> <tr> <td>● 6CT</td><td>● 13IA</td><td>● 20MI</td><td>● 27NH</td><td>● 32ND</td><td>● 38SC</td><td>● 43VT</td><td>○ 49AK(S)</td><td></td></tr> </tbody> </table>	● 1AL	● 7DE	● 14KS	● 21MN	● 28NJ	● 33OH	● 39SD	● 44VA	● 49AK(SE)	● 2AZ	● 8FL	● 15KY	● 22MS	● 29NM	● 34OK	● 40TN	● 45WA	● 50HI	● 3AR	● 9GA	● 16LA	● 23MO	● 30NY(O)	● 35OR	● 41TX(N)	● 46WV	● 51PR	● 4CA(N)	● 10ID	● 17ME	● 24MT	● 30NY(C)	● 36PA(E)	● 41TX(S)	● 47WI	● 52VI	● 4CA(S)	● 11IL	● 18MO	● 25NE	● 30NY(W)	● 36PA(W)	● 41TX(W)	● 48WY	● 53PC	● 5CO	● 12IN	● 19MA	● 26NV	● 31NC	● 37RI	● 42UT	○ 49AK(N)		● 6CT	● 13IA	● 20MI	● 27NH	● 32ND	● 38SC	● 43VT	○ 49AK(S)	
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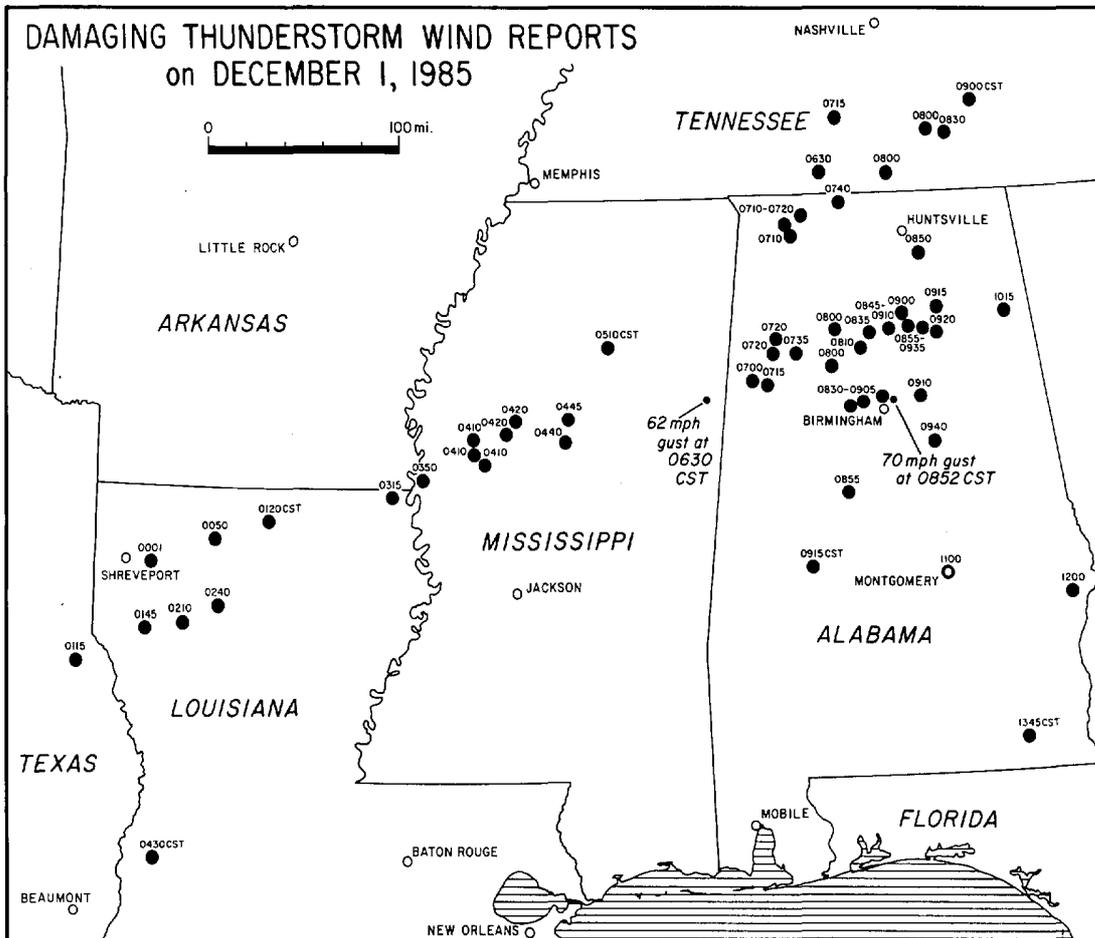




---Data base from NOAA/USDA Joint Agricultural Weather Facility.

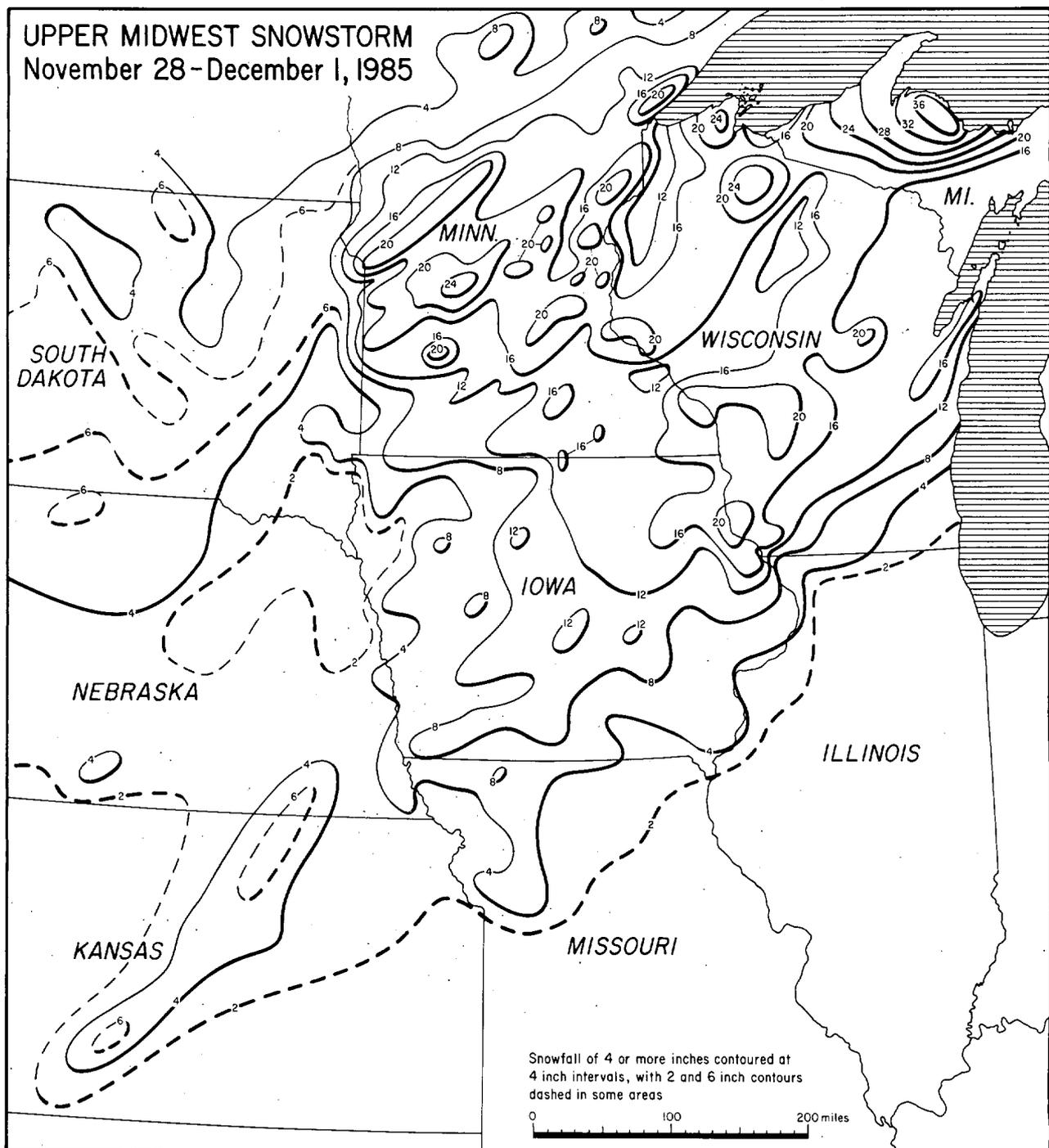
1. THUNDERSTORM WINDS in the SOUTHERN U.S. on December 1, 1985

Strong thunderstorms resulted in 55 damaging wind reports (mapped below) across much of the South as a cold front pushed eastward through the area on the morning of December 1st. The winter storm responsible for the mayhem also produced heavy snow and high winds across the Upper Midwest (see Item 2). ---Data from regional NWSFOs.

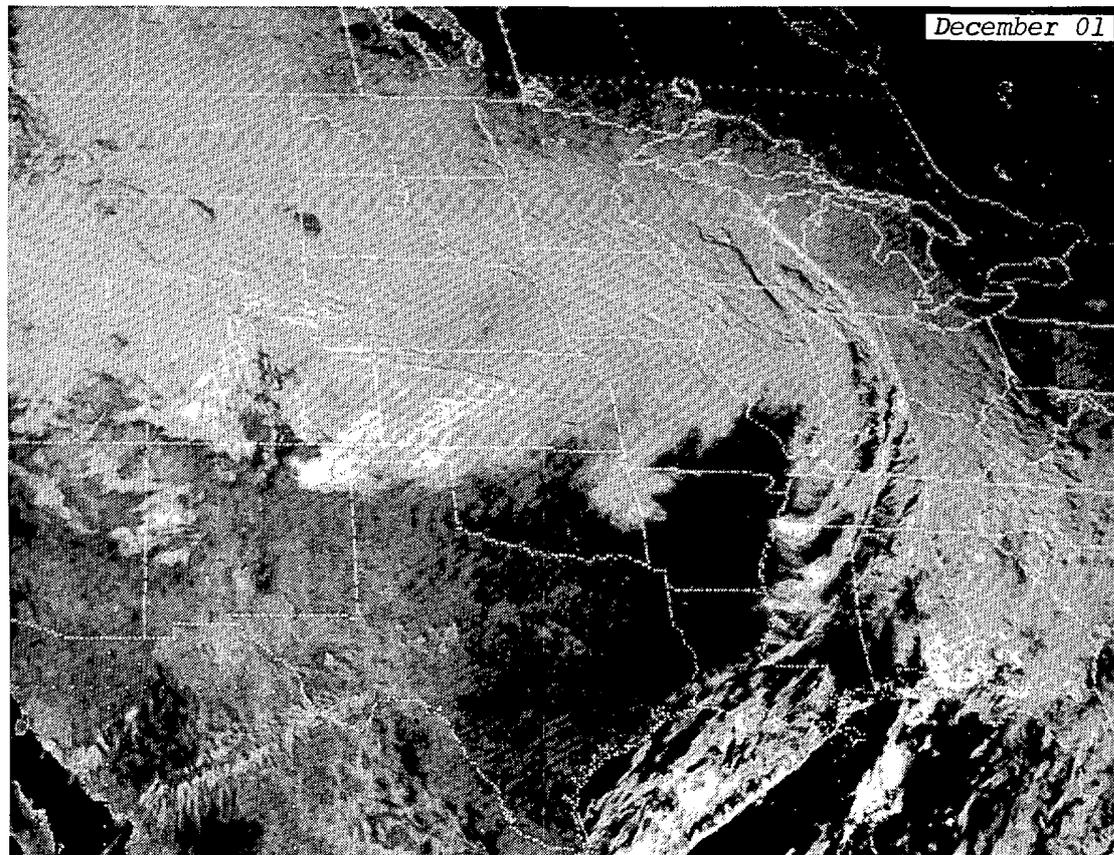
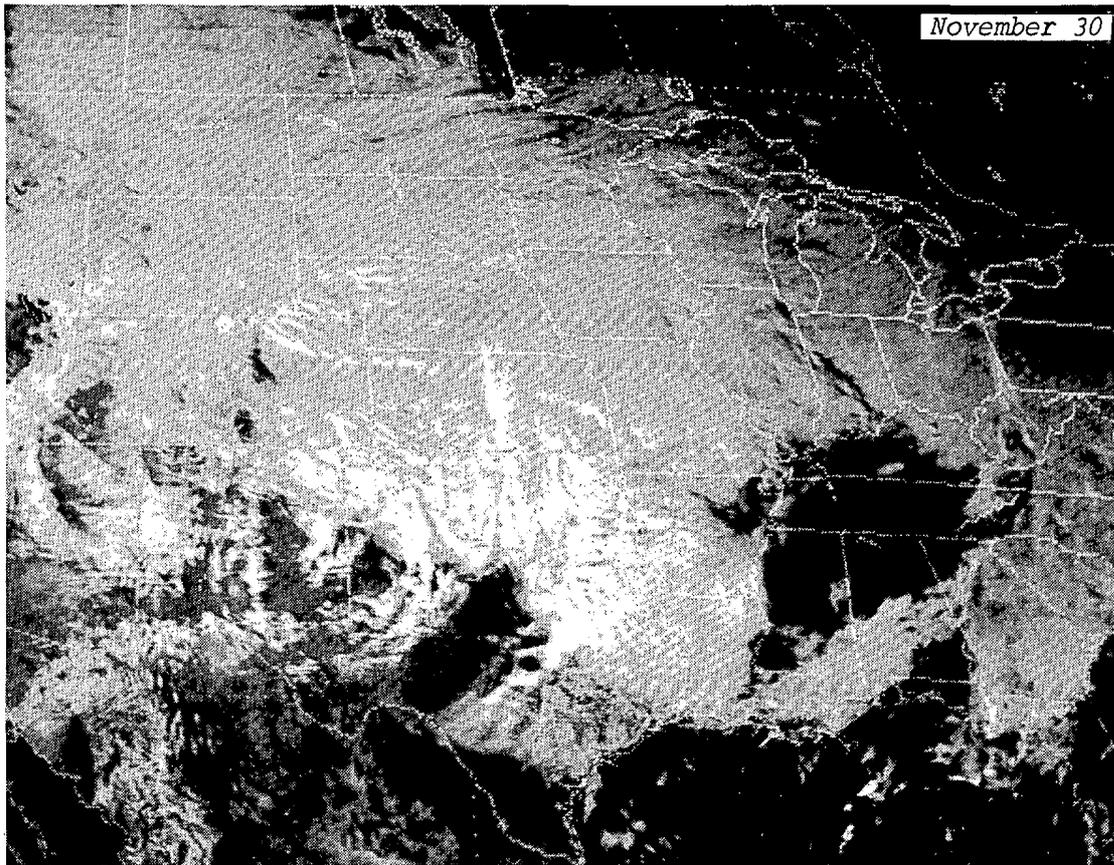


## 2. SNOWSTORM in the UPPER MIDWEST on November 28 to December 1, 1985

Snow began falling over much of the Northern Plains and Upper Midwest as troughing formed and persisted from November 28th through the 30th. A major winter storm then formed late on the 30th and intensified rapidly as it swung northward from central Texas to the Great Lakes area during the morning of December 1st. The snow intensified during the same period and accumulated to up to 2 feet in depth over many areas of Minnesota and Wisconsin, while part of Michigan's Upper Peninsula received up to 3 feet of snow. Strong winds resulting from a rapidly tightening pressure gradient accompanied the storm and blew the snow into huge drifts. The highest recorded snowfall, 36.4 inches, occurred at Marquette, Michigan where wave action from Lake Superior also caused extensive shoreline damage. ---Mapping by the University of Chicago from data supplied by the Illinois State Water Survey, Minnesota State Climatology Office, and NWSFOs at Des Moines, IA; Topeka, KS; Ann Arbor, MI; St. Louis, MO; Omaha, NE; Sioux Falls, SD; and Milwaukee, WI. Note: Strong winds made snowfall measurement difficult at many locations, especially in the northern portion of the analysis area. The smoothed analysis below should be considered representative but not uniformly accurate.



SNOWSTORM in the UPPER MIDWEST ---- continued

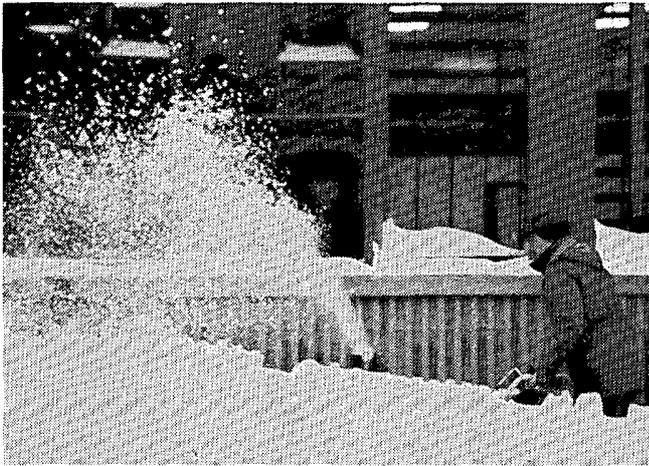


GOES 6 satellite, visible images of the major winter storm at 1430CST (2030GMT) on November 30th and 24 hours later on December 1st. Much of the white area in the bottom photo is snow on the ground, made evident by the dark-appearing, forest-covered Black Hills in western South Dakota, and other visible mountain ranges in the west. ---Photos from NESDIS.

SNOWSTORM in the UPPER MIDWEST ---- continued

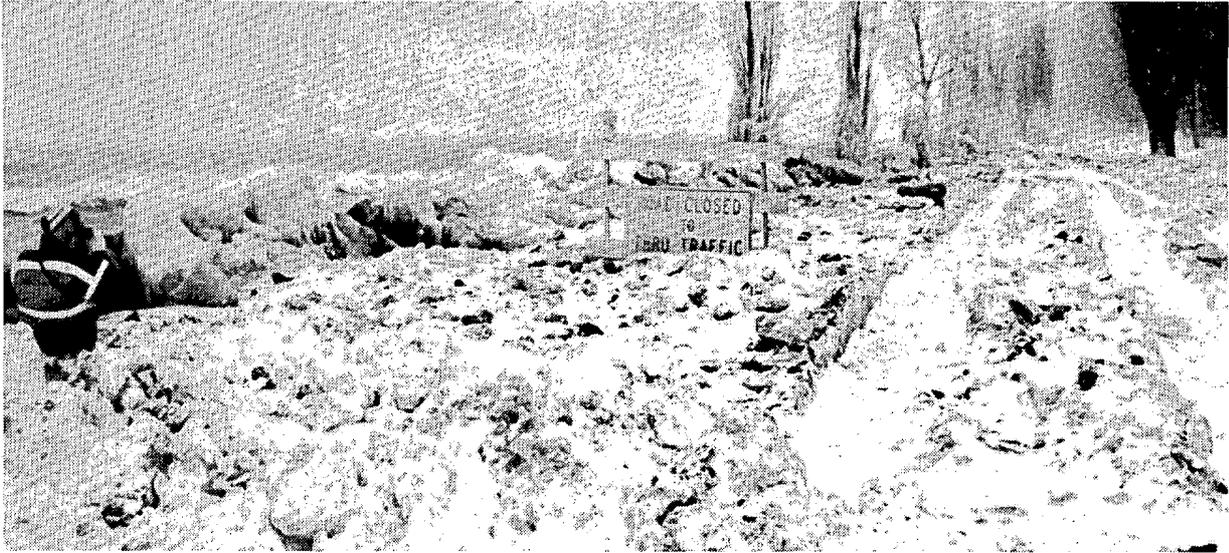


Falling snow obscures an ore loading dock that extends into Lake Superior from Marquette, Michigan. ---Photo by David Edwards.



Also in Marquette, snow clearing (upper left), a wind-blown tree that toppled onto vehicles (lower left), and a lakeshore residence that had its foundation eroded away by the wave action on Lake Superior (right). ---Photos by Linda Szilagyi.

SNOWSTORM in the UPPER MIDWEST ---- continued

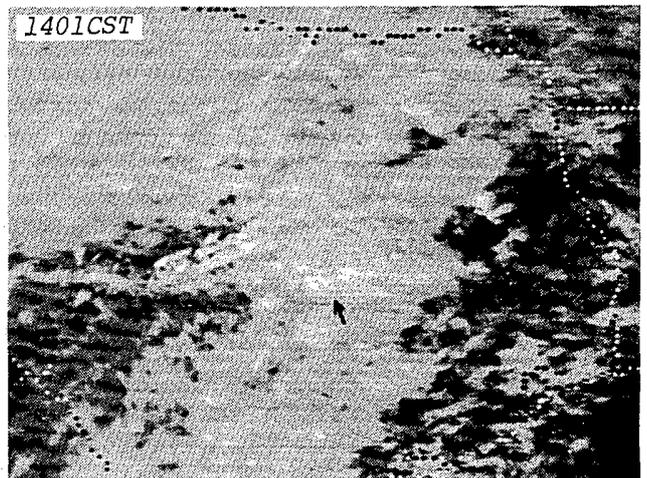
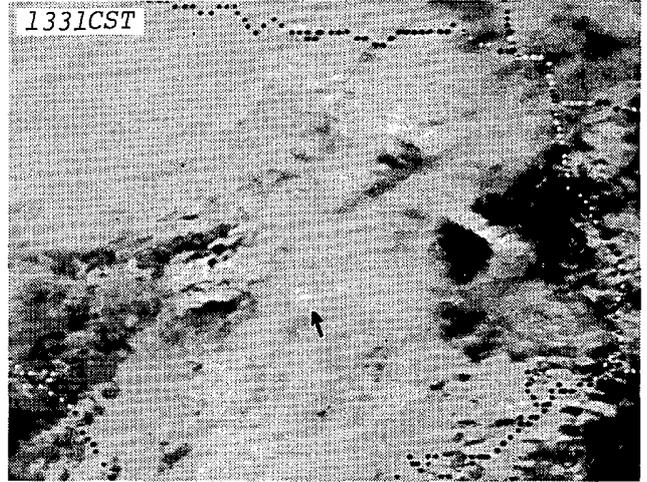
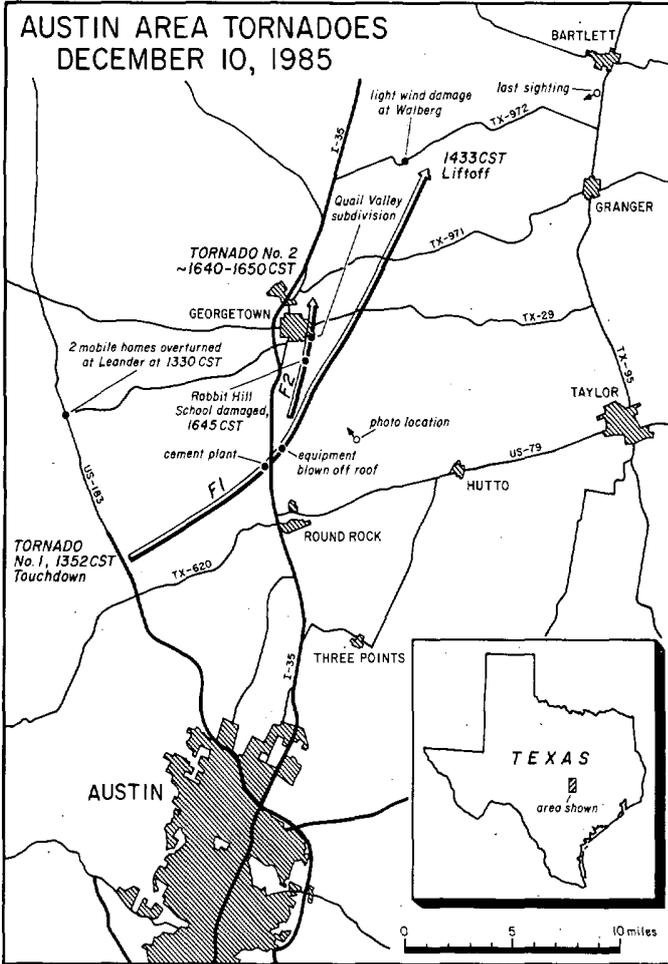


Three additional examples of the lakeshore damage in Marquette which took the form of ice-caked roadways and flooded and debris-strewn yards. ---Photos by Linda Szilagyi.

---All photos on pages 7 and 8 are from The Mining Journal, Marquette, Michigan.

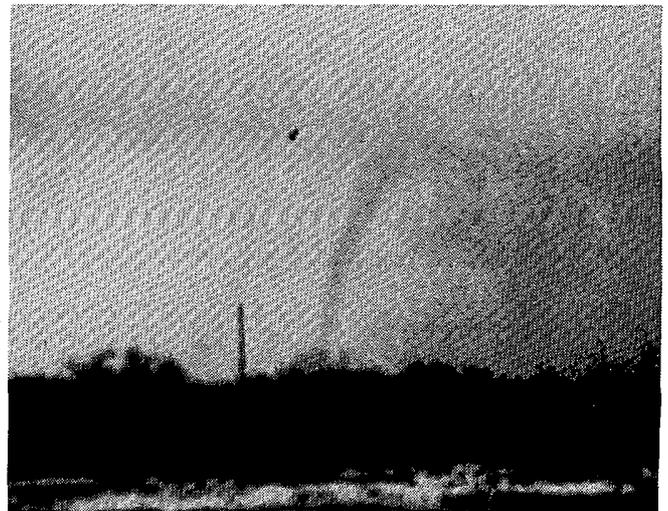
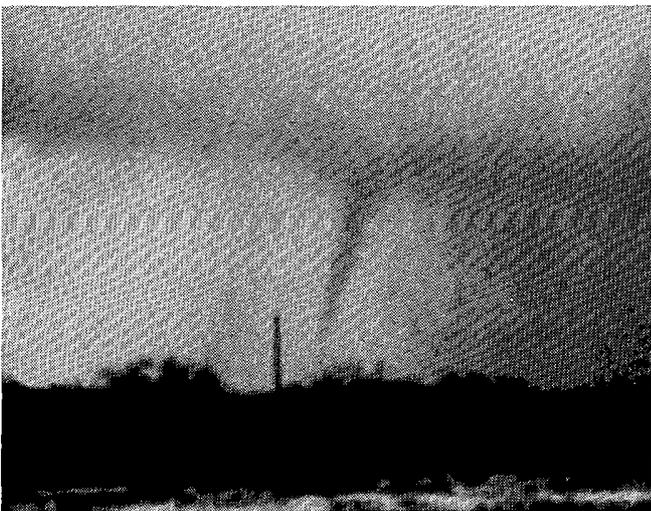
### 3. TORNADOES near AUSTIN, TEXAS on December 10, 1985

On the afternoon of December 10th, 2 of only 3 tornadoes that occurred during December, 1985 struck in the area just north of Austin, Texas. Although their paths were in close proximity to each other, damage from each occurring in about a 7 mile south-southwest to north-northeast stretch between Round Rock and Georgetown, the tornadoes occurred more than 2 hours apart (see map below).



---Tornado tracks supplied by Troy Kimmel, KVUE-TV, Austin, TX; additional information supplied by Jim Dugan, NWSO, Austin, TX.

GOES 6 satellite imagery shows a lone thunderstorm in central Texas (arrow) that produced the first tornado at 1352 CST. ---Photos from NESDIS.

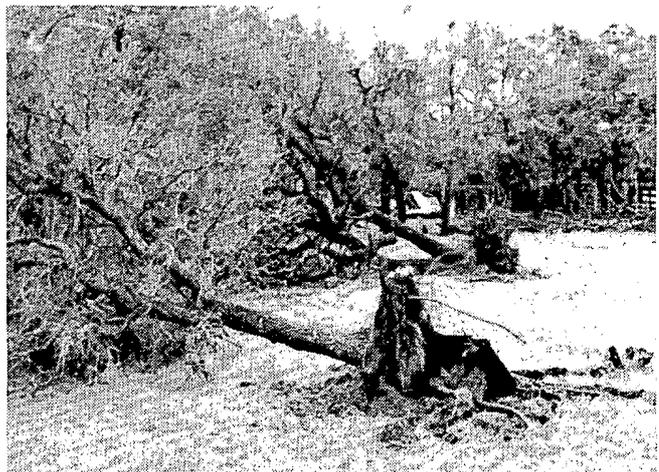
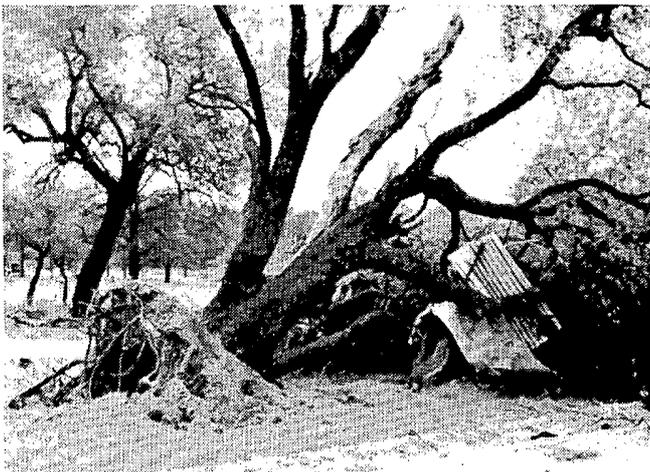


The first tornado as it passed southeast of Georgetown at about 1415 CST. The view is looking northwest toward Georgetown from a position 5 miles northeast of Round Rock (see map). ---Photos by Gary Frey, Georgetown, TX; supplied by Mr. Kimmel.

TORNADOES near AUSTIN, TEXAS ---- continued



Remains of an office building at a cement plant along I-35 that was struck by the first tornado.

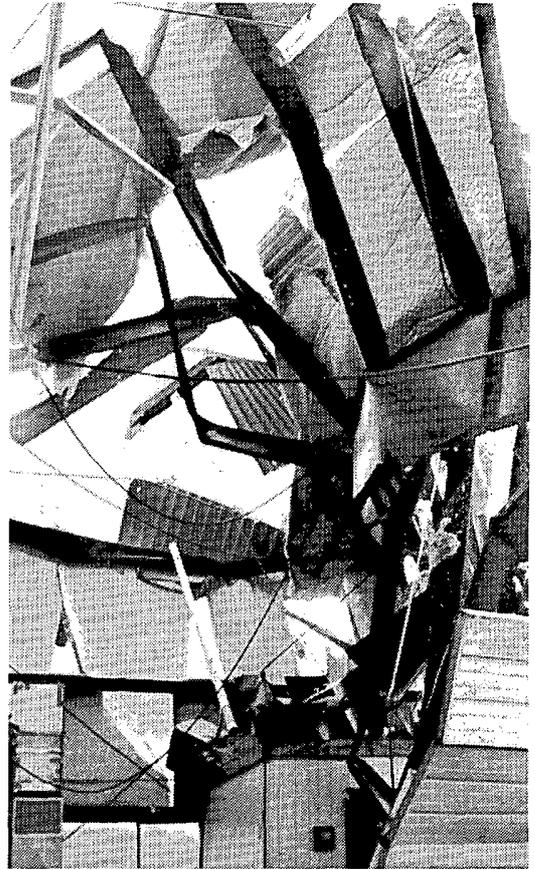
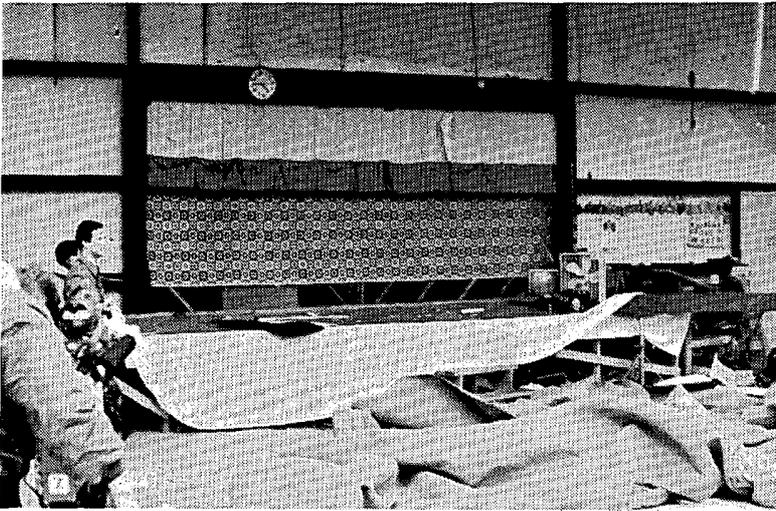


Uprooted trees along the north (left) and south (right) sides of the entrance road to the cement plant.



Air conditioning equipment that the tornado lifted from the roof of a commercial building and blew into a parking lot (left) and into a nearby field (right). Many vehicles in the parking lot were damaged by the flying debris.

TORNADOES near AUSTIN, TEXAS ---- continued



Three pictures of the Rabbit Hill School, located south of Georgetown and which was struck by the second tornado, include (clockwise from top): an exterior view of the destroyed gymnasium, a view upward through the mangled roof of the gym, and the stage within the structure under which 4 teachers and 36 students sought refuge from the approaching tornado. Only 2 students received minor injuries from flying glass.



Typical of the damage in the Quail Valley subdivision of Georgetown, roofing torn from the pictured home was scattered over a neighbor's lawn (left) and a garage suffered the loss of a wall and part of its roof (right).

---All damage photos on pages 10 and 11 are by Troy Kimmel, KVUE-TV, Austin, Texas.

# STORM DATA AND UNUSUAL WEATHER PHENOMENA

DECEMBER 1985

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		

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS				ESTIMATED DAMAGE	CHARACTER OF STORM
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## 1 ALABAMA

Crossville area, Lamar County	01 0700CST	Thunderstorm winds downed some trees and powerlines.	0	0	?	?	?	?	Thunderstorm/Wind
Lauderdale County	01 0710-0720CST	Damage from thunderstorm winds included the roof blown off a mobile home in the Killen area NE of Florence, a church steeple damaged in Florence and some trees and powerlines downed.	0	0	?	?			Thunderstorm/Wind
Muscle Shoals, Colbert County	01 0710CST	Thunderstorm winds downed some trees and powerlines.	0	0	?	?			Thunderstorm/Wind
Fayette County	01 0715CST	Several roofs were damaged and some trees and powerlines were downed by thunderstorm winds in the area west and north of Fayette.	0	0	4	0			Thunderstorm/Wind
Winfield and Brilliant, Marion County	01 0720CST	Thunderstorm winds damaged several roofs and downed some powerlines and trees.	0	0	3	0			Thunderstorm/Wind
Eldridge, Walker County	01 0735CST	A man and a woman were injured when thunderstorm winds destroyed their mobile home. According to reports, the couple was blown through the wall of their mobile home and it then rolled over on them.	0	2	4	0			Thunderstorm/Wind
Good Springs, NW Limestone County	01 0740CST	Some trees were blown down.	0	0	?	?			Thunderstorm/Wind
Smith Lake area, E Winston County	01 0800CST	Thunderstorm winds downed a few trees.	0	0	?	?			Thunderstorm/Wind
Jasper area, Walker County	01 0800CST	The windows were blown out of 5 stores, one home was unroofed and another home was severely damaged by a falling tree. Other homes sustained roof damage and some powerlines were blown down.	0	0	5	0			Thunderstorm/Wind
Flat Rock, SW Cullman County	01 0810CST	Apparent downburst thunderstorm winds unroofed one house, damaged a few other houses, destroyed some tents and blew down about 100 trees.	0	0	4	0			Thunderstorm/Wind
Jefferson County	01 0830-0905CST	Numerous trees and some powerlines were blown down and a few homes were damaged as severe thunderstorms moved eastward across the county. Some of the areas hardest hit were Adamsville, Graysville and the northern part of metropolitan Birmingham. Wind gusts reached 70 mph at the Birmingham airport at 0852CST.	0	0	4	0			Thunderstorm/Wind
Loretta, Cullman County	01 0835CST	At least one house and several outbuildings were damaged and some trees were blown down.	0	0	4	0			Thunderstorm/Wind
Colony and Hanceville areas, Cullman County	01 0845-0910CST	Several buildings were damaged and some trees and powerlines were downed.	0	0	4	0			Thunderstorm/Wind
Owens Cross Roads, Madison County	01 0850CST	Tree limbs were blown through a mobile home.	0	0	3	0			Thunderstorm/Wind
Blount County	01 0855-0935CST	Two occupants of a mobile home were injured when it was destroyed by thunderstorm winds about 4 miles west of Altoona. Other wind damage across the county included a building unroofed in Blountsville, roof damage to other buildings and trees and powerlines downed.	0	2	4	0			Thunderstorm/Wind
Brent area, Bibb County	01 0855CST	Thunderstorm winds downed a large oak tree.	0	0	?	?			Thunderstorm/Wind
Walter and Holly Pond areas, Cullman County	01 0900CST	At least one house was damaged and some trees and powerlines were downed.	0	0	4	0			Thunderstorm/Wind
Moody area, St. Clair County	01 0910CST	Some trees were blown down and winds also damaged the roof of a school.	0	0	3	0			Thunderstorm/Wind
Douglas, Marshall County	01 0915CST	Some trees and powerlines were downed.	0	0	2	0			Thunderstorm/Wind
Uniontown, Perry County	01 0915CST	Thunderstorm winds damaged a mobile home and a gas line.	0	0	?	?			Thunderstorm/Wind
Altoona area, Etowah County	01 0920CST	An apparent downburst from a severe thunderstorm flattened numerous trees.	0	0	?	?			Thunderstorm/Wind

## ALABAMA

Childersburg area, Talladega County	01 0940CST	The canopy was ripped off a service station in Childersburg and some trees were blown down in the area.	0	0	?	?	?	?	Thunderstorm/Wind
Centre, Cherokee County	01 1015CST	Several trees and some powerlines were blown down.	0	0	3	0			Thunderstorm/Wind
Montgomery, Montgomery County	01 1100CST	Powerlines were downed due to strong winds blowing down large tree limbs.	0	0	?	?			Thunderstorm/Wind
Pittsview area, Russell County	01 1200CST	Winds downed two trees and a powerline.	0	0	?	?			Thunderstorm/Wind
Wicksburg area, Houston County	01 1345CST	Thunderstorm winds blew down large tree limbs.	0	0	2	0			Thunderstorm/Wind
Cragford, Clay County	11 1830CST	Thunderstorm winds downed several trees over about a 6 square mile area. Some powerlines were also damaged.	0	0	3	0			Thunderstorm/Wind
Goodway, Monroe County	31 1114CST	Thunderstorm winds uprooted some trees and damaged one home and three vehicles. One large tree fell across the home and caused extensive damage. The home was a mobile home with some rooms added to the structure. Some of the furnishings were blown out of the home.	0	0	4	0			Thunderstorm/Wind
Mobile Bay, Mobile County	31 1200CST	One man drowned when the small boat in which he was a passenger was overturned by strong winds. Strong pressure gradient winds were already occurring in the area when a line of thunderstorms moved eastward across Mobile Bay and the winds increased. The boat was apparently near shore on the northern end of the bay and two men were reported to have swam to safety.	1	0	2	0			Thunderstorm/Wind
6 SW Andalusia, Covington County	31 1240CST	Thunderstorm winds destroyed a mobile home.	0	0	4	0			Thunderstorm/Wind

## 2 ARIZONA

— NONE REPORTED

## 3 ARKANSAS

ARZ001-002-003 Northwest Arkansas	12 2300CST	After having been under a Watch, a Winter Storm Warning was issued at 19:30 CST, December 12th, and it continued in effect until 07:50 CST the following morning. Snow began falling over the northwestern half of Arkansas during the afternoon of the 12th, and tapered off shortly after sunrise the next day. Three to 5 inches of snow fell at Fayetteville, Berryville, Harrison, Marshall, Lead Hill, and Mountain Home. Snow amounts tapered off east and south of the heavy snow area, with the extent being as far east as Newport and Searcy, and as far south as Little Rock and Mena. Numerous traffic accidents and power outages occurred during the height of the heavy snowfall. Many school districts canceled classes and many businesses closed due to hazardous road conditions.	0	0	?	-	-	Heavy Snow
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## 4 CALIFORNIA, Northern

California North Coast	01 All Day	Strong southerly winds of storm force buffeted the entire north coast of California. Speeds of up to 45 knots were reported with gusts of up to 60 knots. Swells and wind-induced waves reached a combined height of 20 to 35 feet along the coast.						Winds
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## 4 CALIFORNIA, Southern

Los Angeles County	02 0700-1900PST	A rainstorm triggered dozens of rain-related traffic problems, and accompanying cold temperatures set a record for the coldest December 2nd in seventy-four years.	0	3	0	0	0	Rainstorm, Cold
Hermosa Beach, Los Angeles County	10 1432PST	A lifeguard at Hermosa Beach observed a waterspout located 20 to 30 miles southwest of the beach.	0	0	0	0	0	Waterspout



# STORM DATA AND UNUSUAL WEATHER PHENOMENA

DECEMBER 1985

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					KILLED	INURED	PROPERTY	CROPS	

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					KILLED	INURED	PROPERTY	CROPS	

## 13 IOWA

[For details on November 30 - December 2 Winter Storm, see November Report]

IAZ004-005 Northwest Iowa	04 Afternoon	0	0	4	0	0	Snow	A localized area of Northwest Iowa received 2-6 inches of snow during the afternoon. The snow occurred in a six-county area, with the heaviest in Cherokee County.
IAZ003-007-008-011 East-Central and Northeast Iowa	26 Afternoon	0	0	4	0	0	Strong Winds	Fierce winds gusting to 55 MPH created havoc in much of Eastern Iowa, producing conditions close to a ground blizzard where snow was loose. More than two thousand people lost power for an hour or so because power lines were blown down.

## 14 KANSAS

KSZ00E-05C South-Central and Eastern Kansas	10 0700-1900CST	0*	0	5	0	0	Ice Storm	Freezing rain and sleet fell upon that part of Kansas east of a line from Kiowa to Hutchinson, Junction City and Seneca. Most of the precipitation fell as sleet in the northeast and accumulated to depths of 1 to 3 inches. Most fell as freezing rain over the east-central, southeast and south-central. Parts of the east-central and southeast measured more than an inch of precipitation, and some places had thunder and half inch hail.  *The sleet and freezing rain made roadways slick and contributed to a number of traffic accidents. One accident south of Erie resulted in seven fatalities, and one person was killed in an accident near Strong City. Ice accumulation on power lines and trees was not heavy enough to cause any major damage.
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## 15 KENTUCKY

----- NONE REPORTED

## 16 LOUISIANA

Bossier Parish	01 0001CST	0	0	?	?	SVR TSTM - Wind, Hail (0.75)	A line of numerous severe thunderstorms moved rapidly across north-west Louisiana between 0001CST-0315CST. Straight-line winds blew down trees at Oakland, Marsilas, Haborton, Martin and between Saline and Friendship. In addition, the wind blew over several mobile homes west of Farmerville and demolished a carport north of Terry. 3/4 inch hail fell at Oakland and Sibley.
Webster Parish	01 0032CST	0	0	?	?	SVR TSTM - Hail (0.75)	
Claiborne Parish	01 0050CST	0	0	?	?	SVR TSTM - Wind	
Union Parish	01 0120CST	0	0	?	?	SVR TSTM - Wind	
Desoto Parish	01 0145CST	0	0	?	?	SVR TSTM - Wind	
Red River Parish	01 0210CST	0	0	?	?	SVR TSTM - Wind	
Bienville Parish	01 0240CST	0	0	?	?	SVR TSTM - Wind	
Nest Carroll Parish	01 0315CST	0	0	?	?	SVR TSTM - Wind	
Calcasieu Parish	01 0430CST	0	0	?	?	SVR TSTM - Wind	A severe thunderstorm took off the roof of a mobile home and shattered a large plate glass window in De Quincy.
Calcasieu Parish	11 0830CST	0	0	?	?	SVR TSTM - Wind	A severe thunderstorm blew off a metal canopy from a bank drive in. A truck was damaged severely when strong winds blew a large tree limb on it. Finally, numerous portable signs were blown over.
St. Tammany Parish	11 1325CST	2.5	25	0	0	4 ?	Tornado (F0)  A small tornado damaged a wall and a roof of a Covington home; a small building just a few feet from the home exploded. The tornado continued north on an intermittent path passing near St. Joseph's Abbey, and did damage to trees in the woods about one mile north of the abbey. The tornado took off the roof of a mobile home on LA 40. Estimated damage: \$40,000.
Caddo Parish	26 0900CST	1	0	0	0	0	Cold  An elderly Shreveport man froze to death outside his home during the night.
Lafourche Parish	27 1130CST	1	0	0	0	0	Cold  A 20 year old Montegut man died of hypothermia on the bank of Bayou Lafourche.

## 17 MAINE

Statewide	2-3 1300EST	0	0	3	0	0	High Winds	The combination of a rapidly intensifying storm, that passed to the north of the state, and its associated cold front that moved through the state, produced very strong west to northwest winds from early Monday afternoon through early Tuesday morning. Both Limestone and Augusta recorded peak gusts of 58 mph (50 Kts). Other peak gusts recorded were from Greenville with 52 mph (46 Kts); Portland with 48 mph (42 Kts); Caribou with 45 mph (39 Kts); Bangor with 44 mph (38 Kts); and Houlton with 43 mph (37 Kts). There was no damage reported and only minor power outages scattered throughout the state. Apparently Hurricane Gloria did a thorough pruning in September.
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## 18 MARYLAND and D.C. ----- NONE REPORTED

## 19 MASSACHUSETTS

Berkshire County	02 Morning	0	0	4	0	0	High Winds	High winds accompanying the arrival of a cold front and gusting to near 60 mph uprooted trees and broke off tree limbs. Many homes and businesses lost electric power in Pittsfield, Becket, Lanesboro, New Ashford, and other towns. About 2,000 customers lost service. Several homes were damaged by falling trees. A woman was trapped in her car in Lanesboro when a tree felled wires across the vehicle. She remained in the vehicle until she was rescued. Route 7 was blocked and closed several times during the high winds. A second story porch was blown off of a house and onto a car in Pittsfield.
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## 20 MICHIGAN

M1Z0016-017-018-020-021- Upper Peninsula	01 AM	0	0	6	0	0	Snow, Wind	Snow accumulations were: Marquette 36.4", Herman 32", Iron Mountain 12". Winds gusted to 52 mph at Marquette. Schools and roads were closed. 9 persons were injured in 40 auto accidents. 220 travelers were housed in emergency shelters. Great Lakes ships took refuge in Whitefish Bay and in Little Bay de Noc.
M1G0103 Baraga and Marquette Counties	01 1900EST	0	0	6	0	0	Lakeshore Flood, Erosion	22 families were evacuated and 40 homes damaged in the City of Marquette and Chocoley Township. Roads were flooded or washed out in the same area and around Keveenaw Bay.
M1D001-002-003-004-005-006-007-008-009-010-011-012-013-014-015-022-	01 2000EST	0	0	5	0	0	Snow, Wind	Winds gusting to 60 mph persisted into the following morning. Minor damage was done to buildings. Highways were made hazardous by accumulating and drifting snow. 72 persons were injured in 740 accidents. Schools were closed and power was out over wide areas. 2 ships broke moorings and went adrift at Charlevoix.
M1G0005-009-019-021-029-047-089-101-105-121-127-139-159- East Shore of Lake Michigan	02 0230EST	0	0	7	0	0	Lakeshore Flood, Erosion	4 houses collapsed into the lake. Waterfront businesses were damaged. 30 families were evacuated. Roads were flooded or washed out.

# STORM DATA AND UNUSUAL WEATHER PHENOMENA

DECEMBER 1985

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	
<b>21 MINNESOTA</b>									
WINZALL Statewide	1-2				0	0	0	0	Blizzard, Heavy Snow
									<p>Snowfall over Minnesota increased from the south during the early morning of December 1st. By 1030 CST the increasing snowfall had spread over all but extreme northwest Minnesota, and winds in the southwest increased to 40 miles per hour, causing blizzard conditions. By late morning, drifts had reached 3 feet and snow plows were pulled off roads from the southwest into central Minnesota due to restricted visibilities. By mid-afternoon, winds up to 50 miles per hour had spread blizzard conditions across the south. Winds from 30 to 40 miles per hour also increased over central Minnesota, blocking roads with drifting snow. Strong winds continued through the evening, then gradually diminished during the morning of December 2nd. Drifts of 4 to 5 feet were reported around Fairmont and Dunnell in Martin County, and some reached as high as 7 feet. At Belgrade in Stearns County, drifts of 8 feet were created around some buildings. Strong winds and cold temperatures broke power lines and caused power outages over portions of southern and west-central Minnesota during the afternoon of December 1st and morning of December 2nd. Many highways were impassable and numerous businesses and schools were closed on the morning of December 2nd until residents could dig out. There were a few travelers that became stranded for up to 6 hours in their vehicles. Traffic accidents also accounted for a number of injuries and a few deaths.</p>
MN2001-002-006 Northwest	25-26	Evening through following morning			0	0	0	0	High Wind
									<p>Snow spread into northwest Minnesota during the evening of December 25th. Highways around Roseau and Crookston were closed by midnight by blowing and drifting snow as a low pressure center moved from Winnipeg toward northeast Minnesota. Northwest winds reached gusts of 50 to 55 miles per hour in northwest Minnesota during the early morning hours of December 26th. Visibilities dropped to zero, forcing traffic to a halt and causing the postponement of many events.</p>
<b>22 MISSISSIPPI</b>									
Washington County	01	0350 CST			0	0	4	0	Thunderstorm Winds
Sunflower County	01	0405 CST			0	0	5	0	Thunderstorm Winds
Humphreys County	01	0410 CST			0	1	5	0	Thunderstorm Winds
Leflore County	01	0425 CST			0	0	5	0	Thunderstorm Winds
Carroll County	01	0440 CST			0	0	3	0	Thunderstorm Winds
Montgomery County	01	0445 CST			0	0	5	0	Thunderstorm Winds
Calhoun County	01	0510 CST			0	0	5	0	Thunderstorm Winds
									<p>A severe thunderstorm moved into Washington County at around 340 AM CST and produced wind damage at 0350 CST at Lake Washington. One mobile home was destroyed while several others received some damage. Many trees were blown down in the area.</p> <p>The storm moved into Sunflower County at Inverness at 405 AM CST, with one house sustaining roof damage. Several farm buildings were damaged and one Church was destroyed. The storm extended southward into northern Humphreys County and damage was reported at Isola and Belzoni at 410 AM CST. A local bar was destroyed in Belzoni, with 6 mobile homes damaged. A roof was blown off a home in Isola and 2 greenhouses were damaged. Power lines and trees were blown down in both towns, and some windows were blown out of store fronts.</p> <p>At 0420 AM CST, the same storm damaged 7 airplanes in a hangar south of Greenwood. A church in Phillips was damaged, and a few trees were blown over.</p> <p>At 0440 AM CST, the storm hit near the town of Vaiden in southern Carroll County. Some roof tops were damaged and some automobiles were damaged by falling trees.</p> <p>At 0455 CST, the storm struck Winona in Montgomery County. High winds damaged a private school, and the damage was estimated at 50,000 dollars. A few airplanes were overturned at the local airport. Trees and power lines were blown over.</p> <p>At 510 AM CST, the storm hit Bruce in Calhoun County, with three different areas of town receiving damage. Several roofs were damaged, store front windows broken and trees and power lines downed. A few sheds collapsed. Winds were estimated up to 80mph.</p>
Monroe County	01	0630 CST			0	0	3	0	Thunderstorm Winds
									<p>A thunderstorm produced winds up to 62mph at the Columbus Air Force Base.</p>
Marshall County	25	early morning			1	0	0	0	Extreme Cold
									<p>A man slept in an unheated hallway, early Christmas morning. Two rooms adjoining the hallway were heated. A door on the north side of the house allowed bitterly cold temperatures to filter into the hallway, causing death by hypothermia. M 34 P</p>
<b>23 MISSOURI</b>									
Central Missouri	17				0	0	6	0	Winter Storm, Ice
									<p>A severe ice storm hit portions of central Missouri on the 17th and knocked power out for 26 hours in some locations. An inch or more of ice coated trees and lines and resulted in limbs breaking and power lines down in a number of communities. Classes were cancelled at a number of schools due to travel problems and to electrical outages at the schools.</p>
<b>24 MONTANA</b>									
MT2008-009 Wilboux, Fallon, and Carter Counties	26	Most of the day							Blizzard
									<p>Light snow and strong winds closed many roads in the three county area.</p>
MT2008-009 Wilboux, Fallon, and Carter Counties	30	0900 to midnight MST							Blizzard
									<p>Winds of over 50 mph reduced visibility to zero and again blocked many roads in the area. In the Baker area, several multi-vehicle accidents occurred in bad visibility and snow-covered roads. One accident involved nine vehicles. Getting feed to livestock was almost impossible for several days, and some loss of livestock resulted.</p>
<b>25 NEBRASKA</b>									
NE2002-003-006 North-Central Nebraska	01	Daytime			0	0	1	1	Ground Blizzard
									<p>Northwest winds gusting to around 45 m.p.h. caused blowing snow that reduced visibility at times to less than a quarter of a mile around Valentine, Mullen, O'Neill and Ainsworth. Some snow drifts to 12 feet were reported.</p>
NE2001 North Panhandle Nebraska	02	Daytime			0	0	1	1	Ground Blizzard
									<p>Wind gusting to 45 m.p.h. caused blowing and drifting snow in Sheridan and Box Butte Counties, which reduced visibility to less than a quarter of a mile at times. Drifting snow blocked roads around Rushville and Gordon, stranding vehicles.</p>
NE2001-005-006-011-012-016 Panhandle and Southwest Nebraska	08-09	Night to Evening			0	0	2	1	Heavy Snow
									<p>Heavy snow of 6 inches or more fell to the south and west of a line from Harrison to Anselmo to Stratton. Some of the heaviest snowfall occurred in the southern panhandle, where Chappell reported 14 inches, Kimball 12 inches, and Scottsbluff, Harrisburg and Ogallala 10 inches. Travel became difficult, and some schools were closed.</p>
NE2011 South Panhandle Nebraska	17	Evening			0	0	1	1	Ground Blizzard
									<p>Strong winds caused visibility to be reduced to near zero at times in blowing snow around Sidney. Roads drifted shut and for a time Interstate 80 was closed to the Wyoming border.</p>
NE2011 South Panhandle Nebraska	19	Morning			0	0	1	1	Ground Blizzard
									<p>Winds caused ground blizzards at times around Sidney and Kimball. Blowing and drifting snow resulted in the Interstate being closed for a period from Sidney to the Wyoming line.</p>
NE2007 Central Nebraska	19	0920CST			0	0	2	1	High Winds
									<p>Northwest winds gusted to 60 m.p.h. at Broken Bow. No damage was reported.</p>
NE2011 South Panhandle Nebraska	24-25	Evening-Morning			0	0	1	1	Heavy Snow
									<p>Heavy snow fell in the south panhandle, with 6 inches reported at Kimball and Chappell.</p>
NE2001 North Panhandle Nebraska	26	Morning			0	0	1	1	Ground Blizzard
									<p>Northwest winds gusting to around 50 m.p.h. whipped snow into ground blizzards in the north panhandle counties of Sioux, Dawes, and Box Butte. People in vehicles became stranded around Hemingford as visibilities lowered at times to near zero in blowing and drifting snow.</p>
NE2002-003-007-008-014 Central Nebraska	26	0630CST-1600CST			0	0	3	1	High Winds
									<p>Strong northwest winds of 55 to 65 m.p.h. buffeted central Nebraska. A peak gust of 65 m.p.h. was measured at Broken Bow at 1148CST. Gusts to 60 m.p.h. were recorded at Valentine and Ord, with gusts to 58 m.p.h. at Ainsworth and Kearney. Only minor property damage was reported.</p>

# STORM DATA AND UNUSUAL WEATHER PHENOMENA

DECEMBER 1985

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	PROPERTY	CROPS	
<b>26 NEVADA</b>											
Stead and Reno, Washoe County	02	1800PST			0	0	?	0			High Wind
			Prefrontal winds gusted to 64 mph in southwest Reno, and gusts to 80 mph occurred in Stead.								
Battle Mountain, Lander County	07	unknown			0	0	3	0			High Wind
			Strong prefrontal winds blew a roof off of a house in Battle Mountain. The wind speed was estimated at over 60 mph.								
<b>27 NEW HAMPSHIRE</b>											
Statewide	2-3	Noon EST			0	0	4	0			High Winds
			The combination of a rapidly intensifying storm, that passed well north of the state, and its associated cold front, that moved through the state, produced very strong west to northwest winds early Monday afternoon through early Tuesday night. The only damage reported was to power lines throughout the state, but this appears to be minor. The hardest hit area was around lakes in the Monadnock Region where the power lines were taken down by wind-felled trees and limbs. About 108 homes in this region were without power for 3 hours or more. The peak gusts recorded were 41 mph (36 Kts) at both Concord and Portsmouth. It should be noted that atop Mt. Washington, elevation 6,288 feet, peak gusts were at 139 mph (121 Kts).								
<b>28 NEW JERSEY, Northern</b> — NONE REPORTED											
<b>28 NEW JERSEY, Southern</b>											
NJZ003 Ocean County	20	1600EST			0	0	1	0			Heavy Snow
			Although snowfall over southern New Jersey generally accumulated to less than 4 inches, some spots in the coastal sections of Ocean County accumulated 6 inches of snow between 4 PM and 10 PM EST.								
<b>29 NEW MEXICO</b> — NONE REPORTED											
<b>30 NEW YORK, Coastal</b> — NONE REPORTED											
<b>30 NEW YORK, Central</b>											
Clinton, Essex, Franklin, Hamilton, St. Lawrence, Oneida and Herkimer Counties	02	0715EST			0	0	5	0			Snow
			A winter storm blasted the northern Adirondack counties. Winds gusted to 40 mph (unofficial) and snow fell to about 5 inches in depth. Local power crews spent 2 days repairing downed power and TV lines. Winds of 52 mph (non-convective @ 1830 EST) were recorded at Booneville during the day of the 2nd. Temperature drops of 20° in 2 hours were common around the Adirondacks.								
Otsego County	02	1500EST			0	0	4	0			High Wind
			High winds knocked down a high power transmission line near Cherry Valley. (non-convective)								
NYZ013	13	0800EST			0	12	4	0			Freezing Rain
			Freezing rain and light snow in the lower Hudson Valley were listed as the cause of several car accidents. In Ulster County, a school bus slid off an icy road, injuring four students.								
NYZ010 Catskill Mountains	13	0800EST			0	0	0	0			Snow
			Over 6 inches of snow fell in the Catskill Mountains. Snow mixed with sleet in lower elevations for a time, but changed back to snow. Winds were gusting to 10-20 mph.								
<b>NEW YORK, Central</b>											
Oneida County	15	1300EST			1	8	5	0			Snow
			A snow squall dumped 2 inches of snow in Deans-buro. An 8 year old boy who was shoveling the snow slipped and fell into a creek next to his home and drowned. His 6 year old sister attempted to save him but was unsuccessful. She suffered from frostbite and exposure. The squall also created blizzard-like conditions in other parts of the county, affecting power lines and transportation. M080								
Montgomery County	18	Unknown			1	1	4	0			Snow Squall
			A snow squall creating poor visibility and icy roads resulted in a fatal accident in the Town of Mohawk. M26V								
Warren County	20	PM			0	0	0	0			Snow
			Over seven inches of snow fell over Warren County. The snow caused parts of State Routes 8 and 9N to be impassable.								
Cortland County	21	0835 EST			1	7	5	0			Snow Squall
			A snow squall hit I-81 near Marathon, Cortland County. As road surfaces became icy, a 10 car and truck accident occurred. One woman was killed and seven others were injured, four seriously. F38V								
NYZ007-008-009 NYZ011-018 Western Mohawk Valley Adirondacks, and St. Lawrence & Champlain Valleys	27	1100EST			0	7	0	0			Winter Storm
			A winter storm settled into Eastern New York, bringing with it heavy snow and gusty winds. Seven teenagers were injured when winds and an icy road surface allowed their car to go off the road where it overturned. One person was treated for frostbite he received while standing outside of the vehicle.								
<b>30 NEW YORK, Western</b>											
NYZ001-022 Erie and Chautauqua Counties	02	Morning			0	0	6	0			Wind & Snow
			A winter storm with gusts of 66 MPH lapped Western and parts of Central New York. It caused damages mostly along the eastern shores of Lake Erie from Dunkirk, Chautauqua County to Grand Island, Erie County. Further inland, the damage was of a lesser degree in the form of downed trees and power lines. Major roads near the Lake Erie shoreline were flooded.  Lake Erie at Buffalo swelled to an unprecedented height of 12 feet above gage datum, or 4 feet above flood stage. Massive waves crashed against shoreline properties; erased retaining walls; splintered homes; and flooded yards, streets, and basements. Big slabs of concrete were torn away from sidewalks and pushed hundreds of feet inland. Carried by the waves, cars were thrown against fences and homes.  In Erie County, twelve homes were destroyed, 14 had major damages, and another 166 had minor to moderate damages. In Chautauqua County, three homes were destroyed. According to officials, damages amounted to \$2.7M dollars on shoreline properties.  Later in the day, temperatures drastically dropped and caused the floodwaters to solidify and encrust the debris. Snow bands off Lake Erie oscillated over Northern Erie to Chautauqua County. Snow depths piled up to 6 inches.								
NYZ-002-004 Ontario, Wayne, Oswego Counties	02	Afternoon to Evening			0	0	4	0			Snow & Wind
			Strong winds and blowing snow combined to produce perilous driving conditions. Power lines were downed. There were many accidents and injuries, especially in Northern Ontario County.  Near Pulaski, Oswego County, a tractor trailer was blown off the road by the wind. Roof shingles littered the highways.								

# STORM DATA AND UNUSUAL WEATHER PHENOMENA

DECEMBER 1985

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					KILLED	INJURED	PROPERTY	CROPS	
<b>NEW YORK, Western</b>									
NYZ002-003-021 Parts of Western and Central NY.	13	Afternoon			0	0	4	0	Snow
Heavy snow caused dangerous driving conditions. There were many accidents with minor injuries. Motorists complained of delays.									
In Wayne County, a woman passenger of a car sliding in snow was killed when the car she was riding crashed into another vehicle. The driver and a few other passengers were injured.									
In Steuben and Onondaga Counties, many cars slid into ditches.									
NYZ001-002-004-005-021-022 Western and Central New York	17	Afternoon			0	0	4	0	Snow
Snow squalls off the Great Lakes produced deep snow over parts of Erie and Jefferson Counties. Hit hardest was Watertown, Jefferson County which received up to 4 feet of snow.									
Zero visibilities in blowing snow forced the closure of countless schools and cancellation of athletic events and meetings.									
All schools in Lewis and Jefferson Counties were closed. In Southern Erie County, schools in Eden, Lake Shore, North Collins, Gowanda, and Springville were also closed.									
Vehicular accidents due to bad weather were reported from many places in Western and Central New York.									
NYZ-001-004 Erie and Jefferson Counties	27	Morning			0	0	5	0	Snow & Wind
Bands of heavy snow off Lake Erie dumped 4 to 12 inches of snow over Erie County. In Carthage, Jefferson County, snow squalls produced 3 feet of snow.									
High winds whipped the snow to produce zero visibilities. There were numerous vehicular accidents, some in chain collisions. Many persons were reportedly hurt and hospitalized. An accident at Ellisburg, Jefferson County resulted in the death of a motorist.									
<b>31 NORTH CAROLINA</b>									
Raleigh, Wake County	21	Early A.M.			1	0	0	0	Cold
A man was found frozen to death in a parking lot.									
East Spencer, Rowan County	21	A.M.			1	0	0	0	Cold
A man died from hypothermia.									
Western North Carolina	25-26				0	0	?	0	Cold, Snow
One to three inches of snow fell in the mountains. Temperatures fell to around zero in many areas, and strong winds caused the wind chill to drop to 30 to 40 below zero.									
<b>32 NORTH DAKOTA</b>									
Northwest, South-Central and Southeast	26	Morning			0	0	3	0	High Winds
Northwest winds of 35 to 50 mph occurred, with occasional gusts over 60 mph. Peak wind gusts of 63 mph, 55 mph, and 63 mph, were recorded at Bismarck, Fargo, and Williston, respectively.									
<b>33 OHIO</b>									
Lake, Geauga and Ashtabula Counties	02	1500EST			0	0	?	?	Heavy Snow
Eight inches of snow fell on these counties between 3:00 p.m. EST 12/2 and 3:00 a.m. EST 12/3.									
Erie and Huron Counties	11	1000EST			0	0	?	?	Flooding
The Huron River went about two feet above flood stage in the Milan area. This flooding caused minor damage in the area. The river went above flood stage at 10:00 a.m. on 12/11 and returned to its banks at 1300 EST 12/12.									
Marion and Pickaway Counties	12	0000EST			0	0	?	?	Flooding
Heavy rains caused the Scioto River to go one foot above flood stage at LaRue, Prospect and Circleville. Little damage occurred. The river went above flood stage at LaRue at 0000 EST 12/12, at Prospect at 1300 EST 12/13 and at Circleville at 1900 EST 12/12.									
Sandusky and Ottawa Counties	12	0700EST			0	0	?	?	Flooding
The Portage River went one-half foot above flood stage in and near Woodville.									
Trumbull County	12	0700EST			0	0	?	?	Flooding
The Mahoning River went one-half foot above flood stage at Leavittsburg. This rise caused flooding in low-lying rural areas.									
Lucas County	12	0800EST			0	0	?	?	Flooding
The Maumee River rose about 3/4 foot above flood stage in the Waterville area. Only minor lowland flooding occurred.									
Williams County	12	1700EST			0	0	?	?	Flooding
The Tiffin River went above flood stage at Stryker. The river rose about one-half foot above flood stage, flooding dormant farm land.									
Lorain, Cuyahoga, Geauga and Ashtabula Counties	13	1300EST			0	0	?	?	Heavy Snow
Four inches of snow fell in Lorain and Cuyahoga Counties between 1300 EST 12/13 and 0100 EST 12/14. Six to nine inches of snow fell in Geauga and Ashtabula Counties between 1300 EST 12/13 and 1300 EST 12/14.									
Ashtabula County	16	1500EST			0	0	?	?	Heavy Snow
Six to eight inches of snow fell on Ashtabula County between 1500 EST 12/16 and 0000 EST 12/17.									
Ashtabula County	17	1200EST			0	0	?	?	Heavy Snow
More than one foot of snow fell on Ashtabula County. Winds drifted the snow and made travel very hazardous.									
Lake, Geauga and Ashtabula Counties	20	1900EST			0	0	?	?	Heavy Snow
Six to eight inches of snow fell on these counties between 1900 EST 12/20 and 0700 12/21.									
Lake and Ashtabula Counties	25	1900EST			0	0	?	?	Heavy Snow
Six to eight inches of snow fell in very heavy squalls near Lake Erie. Gusty winds and the heavy snow caused white-outs and near blizzard conditions.									
Ashtabula County	27	2100EST			0	0	?	?	Heavy Snow
Six to eight inches of snow fell in the county between 2100 EST 12/27 and 0300 EST 12/28.									
<b>34 OKLAHOMA</b>									
OKZ - OSC - OEC - OOC OSW - ONE - OWC - OWC OOP - All but south-east	10	Day - Night			?	?	?	?	Ice Storm
A winter storm produced freezing rain and sleet with snow. Roadways and bridges became slick, causing over 300 accidents with numerous injuries. Power lines became ice-coated, causing power failures in many areas. The Weather Service Office at Oklahoma City was without power for about six hours.									
OKZ - OEC - OSC - OSW OOC - OWC - OWC - ONE All but Southeast and Panhandle	12	Day - Night			?	?	?	?	Heavy Snow
A winter storm produced scattered freezing rain and sleet followed by 2 to 5 inches of snow. Winds of 25 mph caused considerable drifting of snow on east-west roads. Many rural roads were closed, as were many schools due to school buses not being able to run.									

# STORM DATA AND UNUSUAL WEATHER PHENOMENA

DECEMBER 1985

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	

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	

### 35 OREGON

ORZALL	1-2								Snow, Freezing Rain, and Wind
<p>A winter storm brought a mixture of snow, freezing rain, and wind that closed schools, glazed streets and caused numerous minor traffic accidents. One man died from exposure near his home in Burns. Snow, freezing rain and wind caused scattered minor power outages across the state. Blizzard conditions in the Columbia Gorge forced police to close Interstate 84 for several hours. Cold temperatures M610.</p>									
Ontario, Payette County	30								Flooding
<p>Record-breaking cold temperatures during a three week period caused ice to build up along the Snake River. Ice blocks as much as 15 inches thick rammed into the shore, against trees, homes, docks, and bridges, forcing 30 families to evacuate their homes. Also, ice jams caused flooding of low-lying areas.</p>									

### 36 PENNSYLVANIA, Eastern

PAZALL	02 0600EST								Wind
<p>Strong gusty winds, not convective, persisted over Eastern Pennsylvania through the day, with gusts reaching 45 to 55 MPH. For a brief period around 1 PM EST, wind gusts hit 70 MPH at York and 63 MPH at Lancaster. The strong winds brought down quite a few trees and tree limbs. The trees and limbs fell on utility lines, buildings and automobiles. The winds also brought down utility poles and tore off metal awnings and parts of roofs. An 18-year old woman received minor injuries when a tree blew over onto the automobile she was driving in Emmaus, Lehigh County.</p>									
PAZ016	13 0900EST								Heavy Snow
<p>Although snow fell over all of Eastern Pennsylvania, accumulations were generally an inch or two, south, and 3 to 5 inches, north. However, a few spots in Wayne and Susquehanna Counties did accumulate 6 inches of snow between 9 AM and 5 PM EST. The snow caused slippery roadways that resulted in numerous automobile accidents and injuries. At least 3 deaths resulted from these accidents.</p>									

### 36 PENNSYLVANIA, Western

Erie County	02 0130EST								Wind (non-convective)
<p>Wind-driven waves, some 12 feet high, destroyed two summer cottages at Presque Isle off of Lake Erie. A restaurant was also damaged. Some homes had two feet of water in their basements.</p>									
Jefferson County	02 Early morning								Wind (non-convective)
<p>Trees were uprooted by winds gusting to 60 mph at Dubois.</p>									
Greene and Somerset Counties	02 Mid morning								Wind (non-convective)
<p>Wind downed trees throughout these counties, and many homes were without power.</p>									
Westmoreland County	02 0700EST								Wind (non-convective)
<p>A tree downed by wind fell into a house in New Kensington. Light damage occurred.</p>									
Venango, Mercer, Butler and Crawford Counties	02 Mid morning								Wind (non-convective)
<p>Four thousand customers were without power due to downed lines.</p>									
Crawford, Venango, and Erie Counties	02 Afternoon through night								Snow
<p>Six to ten inches of snow fell during a lake-effect snowstorm. Corry (Erie County) received six inches. Meadville (Crawford County) had from six to ten inches.</p>									

### PENNSYLVANIA, Western

Bedford, Blair, Cambria, and Somerset Counties	06 Afternoon through night								Snow
<p>Up to six inches of snow fell throughout the area, with six inches having fallen in the Laurel highlands.</p>									
Erie and Crawford Counties	17- 18 Evening through morning								Snow
<p>Eight inches of snow fell at Erie during a lake-effect snowstorm. Conneaut (Crawford County) reported receiving 8 to 12 inches of snow and 3 to 5 foot drifts from the storm.</p>									
Erie County	25 Afternoon and night								Snow
<p>Erie received another eight inches of snowfall from lake-effect snows. Erie closed out December with 57 inches of snow, setting a new snowfall record for the month. The previous record was set in 1963.</p>									

### 37 RHODE ISLAND — NONE REPORTED

### 38 SOUTH CAROLINA

SCZ004	1 1330EST								Flooding
<p>Lower Piedmont</p> <p>Minor flooding occurred near the Greenwood Methodist Home in Greenwood during a heavy rainstorm.</p>									
Allendale County	13 0330EST								Flash Flood
<p>Flash flooding occurred in the town of Allendale following a downpour of more than 6 inches within a 24 hour period. About 50 homes required evacuation, and water was reported as being waist deep in yards and in some roads such as Raynor Road and Mill Street of Allendale.</p>									
SCZ003	27 EARLY A.M.								Cold
<p>Eastern Piedmont</p> <p>Spencer Rogers, male, age 68, of Union, South Carolina was found dead in a home with no heat. He apparently died of hypothermia.</p>									
SCZ005	22 2300EST								Cold
<p>North Midland</p> <p>A 67 year old man, exposed to the cold weather while walking to his home in Sumter, apparently froze to death and was not found for several days. He apparently died of hypothermia.</p>									
SCZ001-002-003-004-005-006-007-008	26 EARLY A.M.								Cold
<p>Statewide</p> <p>Extremely low temperatures, 5 degrees at Greer and 13 degrees at Columbia, froze water pipes and caused damage to some winter crops.</p>									

### 39 SOUTH DAKOTA

SDZALL	01- Morning								Blizzard, Cold
<p>Statewide</p> <p>02 Early Morning</p> <p>Strong winds gusted to around 40 mph and produced ground blizzard conditions over most of South Dakota. The low visibilities, poor road conditions and strong winds stranded a family for 25 hours south of Colome (Tripp County) and another family for eight hours near Lee's Corner (Brule County). Many roads were blocked in the central and western parts of the state and no travel was advised in the east. The blowing and drifting snow reduced visibilities to near zero and many accidents were reported. The strong winds along with the previous day's snowfall caused some damage including a store's awning in Faith (Deuel County) and the roof of a large barn south of Bemis (Deuel County). Many church services were cancelled on December 1 as were many schools on December 2. Temperatures became very cold during the morning of December 2 in the northwest part of the state. Camp Crook (Harding County) reported a low of minus 36.</p>									
SDZ004-00C	03 Morning								Blizzard, Ice Storm
<p>Western and Central South Dakota</p> <p>Light snow and strong winds gusting to near 40 mph caused ground blizzard conditions over parts of the central and western sections of the state. Schools were cancelled in the Huron (Beadle County) area, and some roads were blocked due to the strong winds. Freezing rain also occurred over the Black Hills and the northwest, making roads slippery.</p>									

# STORM DATA AND UNUSUAL WEATHER PHENOMENA

DECEMBER 1985

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	PROPERTY	CROPS	
<b>SOUTH DAKOTA</b>											
SDZ05E Southeast South Dakota	04	Morning			0	0	0	0			Snow
			Three to six inches of snow fell over southeastern South Dakota. Six inches were reported at Plankington (Aurora County), Elk Point (Union County) and Brandon (Minnehaha County).								
SDZ0NC-05E North-Central and Southeast South Dakota	16	Afternoon			0	0	0	0			Snow
			Two to six inches of snow fell in a band from Mobridge (Walworth County) to south of Sioux Falls. Six inches fell at five miles south of the Sioux Falls airport, Beresford (Union County) and Miller (Hand County).								
SDZALL Statewide	18	Morning			0	0	0	0			Cold
			On one of the coldest mornings of the year, most places in the state had low temperatures less than 20 below zero. The coldest temperature was 30 below zero at Huron (Beadle County) and Canton (Lincoln County).								
SDZ00W-0NC Western and North-Central South Dakota	19	Morning - Late Afternoon			0	0	0	0			Blizzard
			Winds gusted to around 40 mph and produced ground blizzard conditions in some places. Schools were closed in Bowdle (Edmunds County) due to the poor conditions.								
SDZALL Statewide	23- 24	Morning Morning			0	0	2	0			Snow, Blizzard
			Snow fell over the western part of the state on December 23, with the greatest amounts in the northern Black Hills. Deer Mountain received 24 inches, while 14 inches fell at Lead and 12 inches at Deadwood. Strong winds gusting to 50-60 mph developed over the west part of the state on the evening of December 23, with gusts to above 40 mph in the east. The winds caused ground blizzard conditions in the north and central and many vehicles were reported in ditches. Many people were stranded for a time in Martin (Bennett County). Several roads were blocked during this time, including Highway 248 near Murdo (Jones County).								
SDZALL Statewide	25- 26	Morning Evening			0	0	4	0			Blizzard
			Strong winds gusted to 72 mph at Redig (Harding County) and to 80 mph at Brookings (Brookings County). The winds produced ground blizzard conditions, forcing some cars off the road and causing many accidents. The winds tore a roof off a mobile home near Sturgis (Meade County), as well as knocking down signs in town, destroying the city's Christmas decorations. A few power outages occurred at Nemo (Lawrence County) during this period of time and a three-hour power outage occurred in Martin (Bennett County) on the morning of December 26. Many persons were stranded in Martin, Gettysburg (Potter County) and Buffalo (Harding County) during this time. Eight inches of snow fell in Buffalo on the two days and became piled in very high drifts by the winds.								
SDZALL Statewide	28	Morning- Late Afternoon			0	0	0	0			Blizzard
			Strong winds gusted to 40 mph over most of South Dakota and to 60 mph east of the Black Hills. The winds produced areas of blowing snow with near zero visibilities. Buffalo (Harding County), Britton (Marshall County) and New Underwood (Pennington County) all reported near zero visibilities.								
SDZALL Statewide	30	Morning- Late Evening			0	0	0	0			Blizzard
			Winds gusted to 40-50 mph over northern South Dakota through the day and in the southern part of the state by late afternoon. The strong winds lowered visibilities to near zero at times between Lemmon (Perkins County) and Faith (Meade County). The strongest wind gusts were to 63 mph at Mitchell (Davison County). At 2133 CST, the strong winds blew a semi-tractor trailer off the highway, one mile east of Aberdeen.								
<b>40 TENNESSEE</b>											
Lawrence County	01	0630CST			0	0	4	0			Thunderstorm wind
Maury County	01	0715CST			0	0	3	0			Thunderstorm wind
Lincoln County	01	0800CST			0	0	0	0			Funnel Cloud
Lincoln County	01	0800CST			0	0	3	3			Thunderstorm wind
Bedford County	01	0800CST			0	0	2	0			Thunderstorm wind
Coffee County	01	0830CST			0	0	3	0			Thunderstorm wind
Warren County	01	0900CST			0	0	4	0			Thunderstorm wind
			Severe thunderstorms caused a variety of damage in South-Central Tennessee, including the following: A greenhouse at a nursery in Leoma in Lawrence County was destroyed as high thunderstorm winds ripped it down. A large sign was also blown down there. Damage occurred to several garages, carports, and outbuildings in the Mt. Pleasant area of Maury County. Numerous trees were uprooted, and one tree fell through the roof of a house. A car was damaged when a garage collapsed on top of it. A funnel cloud was sighted near the Hot Rock area five miles west of Fayetteville in Lincoln County. Property damage and uprooted trees resulted from the strong thunderstorm winds in Lincoln County also, from Coldwater northward to the Barnes Hollow Road area near Boonshill. Damage included a roof blown off of a barn, causing 600 bales of hay to be soaked by the heavy rain; a chicken house was destroyed; a porch and some windows were blown out of a trailer; a block-type garage was damaged; a tin roof on a barn was blown off; a fruit stand was damaged; and numerous trees were uprooted. In Bedford County, trees were knocked down in southern areas of the county. Near Normandy, one tree fell on a shed and destroyed it. A barn, still under construction, was blown down. Power outages occurred in numerous sections of Coffee County as trees and limbs were blown onto power lines. In Tullahoma, a tree was blown onto a garage, destroying the garage and crushing the auto inside. In Warren County, roofs were blown off of 3 homes in the Morrison area. A tool shed was demolished, and an 18-wheel truck was turned over on its side. Numerous trees were uprooted throughout the county.								
TN2001-002-005 Eastern Tennessee	20	0900EST			1	?	5	0			Snow
			A one inch snowfall caused hazardous driving conditions throughout Eastern Tennessee, which resulted in the drowning death of a 52 year old woman in Hamilton County. She drowned when the car she was driving slid off an ice-covered bridge and plunged upside down into Chickamauga Lake. Over a hundred traffic accidents occurred. Most were minor accidents, but the large number resulted in significant property damage.								
											F52W
TN2001-002 Northeastern Tennessee	31	0800EST			0	?	4	0			Ice Storm
			Freezing rain fell in Northeastern Tennessee during the morning and again in the evening, causing dozens of minor accidents and injuries.								
<b>41 TEXAS, Northern</b>											
Shelby County	1	0115CST			0	0	4	?			Thunderstorm Winds
			Thunderstorm winds removed the porch from a house and damaged several cars in Center.								
Bell County	10	1515CST			0	0	?	?			Thunderstorm Winds
			Thunderstorm winds downed numerous power lines and trees in Bartlett. 3.5 inches rain was reported with the storm.								
TX2022-023-024-027 -031 Eastern Half North Texas	10	1700CST			0	0	?	?			Flooding, Flash Flooding
			Rains of 3 to 4 inches in an area extending from Titus to Hill County, caused widespread flooding with numerous roads closed as streams and rivers reached bankful during the evening hours. The heaviest rains ranged from 4.46 inches at Mt. Pleasant in Titus County to 4.97 inches at Crandall in Kaufman County and 5.5 inches at Bardwell in Ellis County.								
			The first reports of flooding were at 1700CST in Rains County when 2 inches fell in 45 minutes, closing Highway 35. By 2100CST, the service road to Interstate 45 near Ennis, in Ellis County, was closed.								
			Scores of farm roads were closed in the affected area during the night, but the waters began to recede after daybreak of the 11th. By midafternoon, most of the flood waters had receded, with nearly all roads being passable.								
Falls County	10	1710CST			0	0	?	?			Thunderstorm Winds
			Thunderstorm winds downed numerous trees and power lines and damaged several outbuildings in the Rosebud area.								

# STORM DATA AND UNUSUAL WEATHER PHENOMENA

DECEMBER 1985

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	

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	

## 41 TEXAS, Southern

Williamson County	10	1330CST			0	0	5	0	Wind
	10	1352-1433CST	23	100	0	1	5	0	Tornado (F1)

The first reports of destructive winds were from Leander where two mobile homes were overturned, and along Texas Highway 620 west of Round Rock where downed trees and power lines were reported by the Texas Department of Public Safety; both occurring at about 1330CST.

A small tornado touched down at about 1352CST and skipped across mostly open country, causing scattered damage along a 23 mile path from 6 miles south of Leander, northeast to near Walberg about 7 miles west of Granger. In the Bushy Creek area west of Round Rock, there was damage to roofs of homes and fences were downed. The tornado then struck a cement plant along Interstate 35 where a trailer-style office building was destroyed and the windows of 10 cement trucks were blown out. After crossing the Interstate, the tornado blew the air conditioning equipment off of the roof of a commercial building and into a parking lot, damaging several cars. Several of the cars received broken windshields from the flying debris. Nearby, trees were uprooted. As the tornado crossed Chandler and Westinghouse Roads north of Round Rock, several houses in the area suffered major damage to roofs and walls. Several carpools in the area were also ripped off. Some autos were reportedly picked up by the tornado's winds. One construction worker suffered minor injuries when he sought refuge in a storage trailer which was later blown down an embankment. The tornado was lastly sighted from 2 miles east of Georgetown and then from just south of Bartlett, but no damage was reported during either sighting. High winds were reported at Walberg, but little damage occurred. Georgetown reported 2 inches of rain in 40 minutes ending at around 1447CST.

Williamson County	10	1640-1650CST	5	100	0	2	6	0	Tornado (F2)
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A second tornado hit in close proximity to the path of the tornado described above. This tornado was more destructive than the first, but had a shorter path of destruction.

At about 1635CST, a funnel cloud moving northeast was sighted just west of Round Rock. It touched down just northeast of Round Rock and continued north-northeast toward Georgetown as a tornado. It did considerable damage to a school and a day care center. 4 teachers and 36 children were in the school, but shortly before the tornado hit, they had scurried to take cover under the stage floor of the gymnasium. Although the gymnasium was demolished, only 2 students were injured. Their injuries consisted of cuts inflicted by flying glass. The students ranged in age from 6 to 12 years. The tornado hit after school hours, but the teachers and students had stayed late to practice a school play.

From the south side of Georgetown the tornado continued to move north-northeast and hit the Quail Valley subdivision on the south-east side of town where 12 homes were damaged. 24 other homes were damaged by the tornado on the east side of the town. Damage to homes in the area consisted of torn-off roofs and caved-in walls. Several automobiles were damaged and downed trees blocked several streets. The tornado moved across the golf course that adjoins Southwestern University and blew over several trees. There was no damage to the campus of the university. The tornado continued a short distance north-northeast of Georgetown and dissipated.

The total number of homes and businesses in the area that suffered damage from the two tornadoes was 45. 3 of the homes were totally destroyed. One mobile home was destroyed and two others were heavily damaged.

Milam County	10	1630CST			0	1	0	0	Wind
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Near Buckholts in the western part of the county, an 84 year old man was seriously injured when high winds from a thunderstorm blew the door of a residence against him. The severe thunderstorm that produced the high wind was part of the severe weather outbreak associated with the two tornadoes described above.

## 41 TEXAS, Western

Much of West Texas	10-12				0	7	?	?	Winter Storm
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The last significant winter storm of 1985 brought scattered light freezing rain and snowfall to much of West Texas around the middle of the week -- from December 10-12. Precipitation amounts were not overwhelming. Greatest snowfall was a narrow band of 4 to 6 inches from the western South Plains through the southern Panhandle. But the irritating combination of freezing rain and snow; especially on the South Plains, made hardships of dead-of-winter proportions for travelers.

The nemesis, as usual, a west coast trough of low pressure digging into a nearly closed wind circulation over southern California spat out a series of short waves across West Texas before it crossed the area with little fanfare on Friday the 13th.

Winter Storm Watches and Warnings were issued early for much of West Texas.

## TEXAS, Western

Balmy, almost perfect, weather preceded the cold front that slid across most of the area late Monday and Tuesday, the 9th and 10th. Temperatures from 70 to 75 Monday became 25 to 30 by Tuesday afternoon. Overrunning from the approaching west coast trough began almost immediately. Light freezing drizzle over the Panhandle Monday slid into the South Plains Monday night and Tuesday. The cold air -- though steadily building southward across the area -- took nearly 24 hours to freeze the entire layer above the South Plains. Periods of freezing drizzle and freezing rain continued most of that time until a hard glaze had been formed. Late Tuesday (10th) night a short wave crossed the area with a barrage of freezing rain followed by about a 1-inch snowfall for much of Northwest Texas, except for an area of 2 or more inches with maximum of 6 inches at Tulla in the Panhandle.

There were numerous disruptions of normal activities. Schools were closed in many sections due to the dangerous streets and roads. There were numerous automobile collisions; some resulting in minor injuries to seven persons. Airports were closed at times due to the thick fog and ice on runways that developed with the storm.

The winter storm was quite extensive, but it was relatively gentle. The front was slow and the onset of precipitation was easy to follow.

## 42 UTAH

UTZ003-010 Wasatch Front and Northern Wasatch Mountains	08-	0000MST 08 2300MST			3	0	2	0	Heavy Snow
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A major winter storm dumped heavy snow over most of the Wasatch Front and Northern Wasatch Mountains on this Sunday. A man and woman were killed instantly and another man died later, from injuries received when their car slid into the path of a semi-tractor trailer. Snowfall totals included: 10.5 inches at the Salt Lake City International Airport, 18 inches in Holladay, 22 inches in Olympus Cove, 21 inches at Spanish Fork, 19 inches in Bountiful, and 46 inches at Snowbird ski resort.

UTZ003 Wasatch Front	10-	0000MST 10 2300MST			0	0	5	0	High Winds
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Easterly canyon winds blew to hurricane force for most of the day during the Tuesday. The winds caused a snow drift to build up on the roof of a Salt Lake City fabric shop, which collapsed the roof. Many schools were closed and ground blizzard conditions prevailed along the east bench areas of the Wasatch Front. Some measured maximum wind gusts included: 74 mph on the east bench of Centerville, 65 to 70 mph in Bountiful, 72 mph at Smithfield, 68 mph at Utah State University in Logan, and 76 mph at Farmington.

## 43 VERMONT

Statewide	13	PM			0	4	5	0	Snow
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A winter storm dumped 6-12 inches of snow across all of Vermont. Local police reported a rash of fender-benders, some with injuries.

## 44 VIRGINIA

----- NONE REPORTED

## 45 WASHINGTON

Statewide	2	Day			1	0	4	0	Ice Storm
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A major winter storm hovered off the Washington and Oregon Coasts and caused widespread freezing precipitation. Ice coatings of up to 1-1/2 inches on roads and buildings caused one fatal car accident in Seattle and a department store roof to collapse. Winds with the storm ranged to near 60 mph near the Western Cascade Mountain foothills.

Puget Sound	7-26				0	0	0	0	Fog
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For over a week, dense fog blanketed the areas around Puget Sound in Western Washington. Seattle-Tacoma International Airport was closed for several days straight, stranding tens of thousands of Christmas Holiday travellers. Visibilities were often near zero the entire week. Several serious accidents included one fatality.

# STORM DATA AND UNUSUAL WEATHER PHENOMENA

DECEMBER 1985

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS		ESTIMATED <sup>1</sup> DAMAGE		CHARACTER OF STORM
					KILLED	INJURED	PROPERTY	CROPS	
<b>46 WEST VIRGINIA</b>	NONE REPORTED								
<b>47 WISCONSIN</b>									
WIZALL Statewide	12th through 29th				4	0	?	0	Severe Cold
	<p>An extended cold spell gripped the state mainly from the 12th of December through the 29th. During this period, 4 people died of hypothermia directly related to the cold. A woman died on the 18th while trying to seek shelter after her car became stuck in the Town of Pleasant Prairie (Kenosha County). Also on the 18th, a man died on the steps of his home in Pulcifer (Shawano County). A Salem (Kenosha County) woman was found lying in the snow outside of her home on the 24th. A teenage Fond du Lac boy died from the cold, 6 blocks from his home. Temperatures during the cold snap frequently fell below zero, with bitter wind chills of 20 to 60 below zero at times. Scattered power outages occurred, including one which affected 30,000 people over northeast Wisconsin for over 4 hours. Numerous vehicle failures and frozen water pipe damages were directly attributed to the cold. F670 M680 F750 M140</p>								
<b>48 WYOMING</b>									
Albany and Carbon Counties	02 2215MST				0	0	0	0	High Wind
	Winds gusting to 60 mph were logged at Vedaawoo in Albany County and at Arlington in Carbon County.								
Fremont County	8-9 Both Days				1	1	0	0	Snow
	Record-breaking snow at Lander fell during the 8th and morning of the 9th. Lander received 28 inches followed closely by Riverton with 25 inches. A man near Crowheart Butte suffered a heart attack and died from shoveling snow. A snowmobiler suffered a broken ankle when a group of 7 got stranded in the storm on Union Pass south of Lander.								
Southwest Wyoming	8-9 Both Days				0	0	0	0	Snow
	Accumulations of 6 to 12 inches were common through Lincoln, Sweetwater, and Carbon Counties of southwest Wyoming during a snow storm. In Lincoln County, Kemmerer got 21 inches and Labarge, 18 inches. Rock Springs, in Sweetwater County, got 12 inches of snow. Winds gusting to 50 mph from Rawlins to Rock Springs, on the 9th, caused blizzard conditions and shut down most of the roads in the southwest part.								
East-Central and Southeast Corner Areas of the State	09 Day				0	0	0	0	Snow
	Snow accumulations of 6 to 9 inches were common in east-central and the southeast corner areas of the state during the morning and afternoon of the 9th. Casper in Natrona County received 10 inches. Douglas, Converse County received 9 inches and Cheyenne, Laramie County received 8 inches of new snow.								
Vedaawoo, Albany County	13 2215MST				0	0	0	0	High Wind
	Winds gusting to near 60 mph were logged at Vedaawoo in extreme east Albany County.								
Albany and Carbon Counties	14 Day				0	0	0	0	High Wind
	Wind gusts to 68 mph were recorded at Vedaawoo in Albany County at 0800MST. Gusts to around 55 mph were logged at Arlington in Carbon County at 1545MST.								
Arlington, Carbon County	17: 1025MST				0	0	0	0	High Wind
	Wind gusts to 60 mph were noted at Arlington in extreme east Carbon County.								
Sundance, Crook County	18-19 Overnight				0	0	0	0	Snow
	Ten inches of snow fell overnight at Sundance.								
Vedaawoo, Albany County	24 0400MST				0	0	0	0	High Wind
	Gusts to 70 mph were clocked at Vedaawoo.								
Albany and Carbon Counties	25 2150MST				0	0	0	0	High Wind
	Gusts to near 60 mph were logged at Arlington in Carbon County and Vedaawoo in Albany County.								
Vedaawoo, Albany County	26 0415MST				0	0	0	0	High Wind
	Wind gusts to 65 mph were logged at Vedaawoo.								
Vedaawoo, Albany County	29 2200MST				0	0	0	0	High Wind
	Wind gusts to 67 mph were clocked at Vedaawoo.								
Vedaawoo, Albany County	30 0415MST				0	0	0	0	High Wind
	Wind gusts to 65 mph were logged at Vedaawoo.								
<b>49 ALASKA, Northern</b>	NO REPORT RECEIVED								
<b>49 ALASKA, Southern</b>	NO REPORT RECEIVED								
<b>49 ALASKA, Southeastern</b>									
Southern Southeast Alaska	3-4				0	0	3	0	High Wind
	A strong low pressure system moved into the north-east Pacific on the 3rd and 4th, causing strong winds especially in the southern sections of Southeast Alaska. Winds of over 60 mph were recorded at the field level of the Ketchikan Airport while gusts of over 80 mph were measured on the roof of that terminal. Numerous power outages resulted from these winds and a water main bridging a Ketchikan creek was blown apart.								
<b>50 HAWAII</b>									
All Islands	9-11				0	0	4	0	Surf
	High surf measured at about 30 feet at times along the Oahu and Kauai north shores.								
All Islands	21				0	0	5	0	Surf
	High surf measured near 30 feet along the Oahu north shore. High waves off of the Hanelei coast of Kauai capsized a 32 foot boat and swept a security guard overboard. The guard was rescued about 3 hours later, at around 0600HST.								
Hawaii	30 0900HST				0	0	0	0	Waterspouts
	Several waterspouts were reported off the Kau coast by Volcano Park personnel.								
Hawaii	30- 2200-31 0600HST				0	0	4	0	Wind
	Strong, gusty, northerly winds caused roof damage to several homes in the Kamuela and Kawaihae area.								
<b>51 PUERTO RICO</b>	NONE REPORTED								
<b>52 VIRGIN ISLANDS</b>	NONE REPORTED								
<b>53 PACIFIC</b>	NONE REPORTED								

# STORM SUMMARY

DECEMBER 1985

STATE	TORNADOES					HAILSTORMS				WINDSTORMS				LIGHTNING				FLOODING				@HEAVY SNOWSTORMS AND BLIZZARDS				# ICE STORMS				ALL OTHER			
	NUMBER	DAYS	DEATHS	INJURIES	†DAMAGE	DEATHS	INJURIES	†DAMAGE		DEATHS	INJURIES	†DAMAGE		DEATHS	INJURIES	†DAMAGE		DEATHS	INJURIES	†DAMAGE		DEATHS	INJURIES	†DAMAGE		DEATHS	INJURIES	†DAMAGE					
								PROP. ERTY	CROPS			PROP. ERTY	CROPS			PROP. ERTY	CROPS			PROP. ERTY	CROPS			PROP. ERTY	CROPS			PROP. ERTY	CROPS	PROP. ERTY	CROPS		
Alabama									1	4	5																						
Arizona																																	
Arkansas																																	
California																																	
Colorado																																	
Connecticut																																	
Delaware																																	
Florida																																	
Georgia																																	
Idaho																																	
Illinois																																	
Indiana																																	
Iowa																																	
Kansas																																	
Kentucky																																	
Louisiana	1	1			4			?	?																								
Maine																																	
Maryland & DC																																	
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New Mexico																																	
New York																																	
North Carolina																																	
North Dakota																																	
Ohio																																	
Oklahoma																																	
Oregon																																	
Pennsylvania																																	
Rhode Island																																	
South Carolina																																	
South Dakota																																	
Tennessee																																	
Texas	2	1			3	6																											
Utah																																	
Vermont																																	
Virginia																																	
Washington																																	
West Virginia																																	
Wisconsin																																	
Wyoming																																	
Alaska	‡																																
Hawaii																																	
Pacific																																	
Puerto Rico																																	
Virgin Islands																																	

# GENERAL SUMMARY OF TORNADES, 1985

HENRY N. VIGANSKY  
 NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
 NATIONAL ENVIRONMENTAL SATELLITE DATA, AND INFORMATION SERVICE  
 NATIONAL CLIMATIC DATA CENTER

A total of 684 tornadoes were reported in the United States during 1985, which was well below the 33 year (1953-1985) national average of 749. Twenty of these storms were responsible for the deaths of 94 people. Twenty-eight of the fatalities occurred in mobile homes. Over 550 mobile homes were either damaged or destroyed. Total property damage was estimated to be in excess of \$500 million. No tornado activity was reported in the following states: Alaska, Delaware, Maine, Maryland, Nevada, New Hampshire, Oregon, Utah, and Vermont. Locations of killer tornadoes, new monthly records since 1953 by state, and state to state border crossings are shown in the following tables:

## LOCATION OF KILLER TORNADES

<u>DATE</u>	<u>STATE</u>	<u>COUNTY</u>	<u>TOTAL DEATHS</u>
March 17	Florida	Sarasota	2
April 5	Illinois	Randolph	1
April 21	Texas	Throckmorton	3
April 28	Texas	Taylor	1
May 30	Iowa	Clayton	2
May 31	Ohio*	Trumbull	10
May 31	Ohio	Licking	1
May 31	Pennsylvania	Lycoming	2
		Northumberland	2
		Union	2
May 31	Pennsylvania	Erie	12
May 31	Pennsylvania	Crawford	1
May 31	Pennsylvania	Crawford	9
		Forest	7
May 31	Pennsylvania	Venango	7
May 31	Pennsylvania	Crawford	2
May 31	Pennsylvania*	Mercer	8
May 31	Pennsylvania	Beaver	3
		Butler	6
May 31	Pennsylvania	McKean	4
June 8	Michigan	Menominee	1
June 8	Wisconsin	Oneida	2
August 12	Wisconsin	Juneau	2
August 16	Alabama	Walker	1
November 18	Arkansas	Marion	3

\*Same tornado crossed state boundary.

## NEW MONTHLY RECORDS (SINCE 1953)

<u>MONTH</u>	<u>STATE</u>	<u>NEW RECORD</u>	<u>PREVIOUS RECORD (YEAR)</u>
March	Arizona	3	1 (1958)
March	Nebraska	4	2 (1975)
March	Ohio	6	5 (1955)
April	Nebraska	15	14 (1974)
April	South Dakota	12	9 (1955)
May	Pennsylvania	20	5 (1983)

# GENERAL SUMMARY OF TORNADES

August	Alabama	22	2 (1983)
August	Louisiana	7	4 (1954)
August	Mississippi	3	2 (1977)
August	Rhode Island	1	-0-
August	South Dakota	10	6 (1982)
August	Tennessee	5	1 (1984)
September	Mississippi	6	4 (1982)
September	Nebraska	7	4 (1955)

## STATE TO STATE BORDER CROSSINGS

<u>DATE</u>	<u>STATE</u>		<u>STATE</u>
April	Louisiana	into	Arkansas
May	Kansas	into	Nebraska
May	Iowa	into	Wisconsin
May (4 tornadoes)	Ohio	into	Pennsylvania
May	Pennsylvania	into	New York
June	Ohio	into	Pennsylvania
August	Connecticut	into	Rhode Island

On January 17th, the first tornado of the season originated as a waterspout off the Florida coast at Panama City Beach. The waterspout/tornado damaged several roofs, and a small boat was blown across a highway.

The first killer tornado of the 1985 season touched down on March 17, 1985, two miles (3.2 km) southwest of Venice, Florida; it destroyed 55 homes and damaged 250 others. A 65 year old woman was killed while inside a camper, and a 66 year old man was killed while standing on a front porch. Forty-five people were injured.

A 400 yards (366 m) wide multiple-vortex tornado touched down in Throckmorton County, Texas and moved into Young County on April 21, 1985. At the county line the tornado struck a frame home, and totally destroyed the structure and surrounding buildings. The owners of the frame home, ages 88 and 86, and their son who was 64 years old, were killed.

On May 31st, tornadoes caused death and destruction in Ohio, Pennsylvania and New York. This was the most devastating outbreak of tornadoes since the super-outbreak of April 3-4, 1974. The first tornado of the outbreak touched down at 3:59 p.m., southeast of Monroe Center, Ohio, and moved east-northeast into Pennsylvania to 3 miles (4.8 km) east-northeast of Cranesville, Pennsylvania. The tornado destroyed 10 blocks of residential area and a trailer park in Albion, and leveled two trailer parks in Cranesville. Nine people were killed in Albion, and three in Cranesville. The tornado damaged or destroyed 308 buildings, and caused 12 deaths and 82 injuries. A strong tornado touched down southwest of Mesopotamia, Ohio, at 4:05 p.m., and moved to just southeast of Orwell, Ohio. The tornado touched ground for 15 miles (24.1 km). Forty homes were destroyed, and numerous homes and farm buildings sustained major damage. Thirty people were injured. At 4:10 p.m., a waterspout/tornado touched down on Pymatuning Reservoir and moved on shore 1-1/2 miles (2.4 km) west of Linesville, Pennsylvania. The tornado caused considerable damage to campgrounds, and resulted in one death when a woman was crushed to death under her trailer. At 4:17 p.m., a tornado touched down in the extreme northeast corner of Trumbull County, Ohio. The tornado was on the ground for only a few hundred yards in Ohio before entering Pennsylvania at the Mercer-Crawford County Line. It continued moving east-northeastward passing through portions of Jamestown, Atlantic, Cochran, Hannasville, Cooperstown and Cherry Tree, Pennsylvania, where it turned southeast and terminated four miles (6.4 km) south of Tionesta, Pennsylvania. The tornado left a 56 mile (90.1 km) path of destruction which exceeded \$5 million. Sixteen deaths were reported and 125 people were injured. A tornado touched down at 4:23 p.m., two miles (3.2 km) south of Saegertown, Pennsylvania, leaving an intermittent path of destruction to two miles (3.2 km) east-northeast of Centerville, Pennsylvania. Detailed damage assessments were not submitted. Two people were killed in Centerville. At 4:25 p.m., a tornado touched down two miles (3.2 km) east-southeast of Waterford, Pennsylvania, moved eastward to three miles (4.8 km) north of Corry, then turned northeast and crossed the state line into New York at about five miles (8 km) west-northwest of Clymer, New York. The twister moved east-northeastward for eight miles

## GENERAL SUMMARY OF TORNADOES

(12.9 km) through rural areas to one mile (1.6 km) northeast of Watts Flats, New York. In Pennsylvania over 70 buildings were destroyed. Seventeen people were injured. Damage assessment for the New York portion of the track will be included with the twister that touched down two miles (3.2 km) east of Busti, New York. Five miles (8 km) southeast of Jefferson, Ohio, at 4:28 p.m., a tornado touched down and moved east-northeastward and passed south of Pierpoint, Ohio, and turned east continuing into Pennsylvania for one mile (1.6 km). In Ohio the storm damaged several homes and farm buildings. Damage was minimal in Pennsylvania. At 5:12 p.m., a tornado moved from two miles (3.2 km) west-southwest of Centerville, to one mile (1.6 km) east of Buells Corner, Pennsylvania. Numerous houses, trailers and barns were destroyed. Also destroyed was a State Department of Transportation building valued at \$500,000. A tornado touched down two miles (3.2 km) east of Busti, New York, at 5:25 p.m. The tornado moved through Busti, and portions of Harmony, Kiantone, and Carroll, New York. Seventy homes were damaged or destroyed. Several businesses, a church and numerous cars were damaged. Total damages exceeded \$4 million (Damage report included the Clymer tornado.) Ten people were hospitalized. At 5:30 p.m., a huge tornado touched down 1-1/2 miles (2.4 km) north of Charleston, Ohio, and moved eastward destroying the major portion of Newton Falls and continued east through parts of Lordstown, Niles, Coalburg and Hubbard, before moving into Pennsylvania. Ten people were killed in Niles. In all areas mentioned 250 people were injured, damage estimates were more than \$60 million. The tornado entered Pennsylvania one mile (1.6 km) west of Wheatland and continued east to two miles (3.2 km) southwest of Mercer, Pennsylvania. Ninety-five percent of Wheatlands industry was destroyed. Eight people were killed and 60 were injured. Farther east in Hermitage, Pennsylvania, the tornado created havoc to homes and industrial areas. The tornado left a 47 mile (75.6 km) path of destruction in Ohio and Pennsylvania. Two tornadoes touched down at 5:30 p.m. One touched down in Warren County, Pennsylvania, damage was limited to trees. The second tornado touched down seven miles (11.3 km) northeast of Tionesta and left a 29 mile (46.7 km) path of destruction to seven miles (11.3 km) northeast of Marienville, Pennsylvania. Over 500 structures were damaged, and another 140 were destroyed in German Hill, Starr, Green Hill, Whig Hill and Kellettsville areas. Seven people were killed, and 30 were injured. At 5:50 p.m., a tornado touched down four miles (6.4 km) southwest of Chaffee, Pennsylvania and was intermittently on the ground to eight miles (12.9 km) east of Kane, Pennsylvania. Damage was light and occurred mostly to trees. A mini-tornado touched down at 6:06 p.m., west of London, Ohio. Minor damage was confined to farm buildings and utility lines. At 6:15 p.m., a tornado touched down northeast of Johnstown, Ohio and moved east-northeastward passing south of Utica to West Carlisle, Ohio. One man was killed near Fallsburg, Ohio and 20 people were injured at various locations along the tornado path. Several homes and farm buildings were destroyed. A tornado touched down at 6:30 p.m., three miles (4.8 km) west of Tidioute and traveled 17 miles (27.4 km) east to three miles (4.8 km) south of Cherry Grove, Pennsylvania. Thirty-two buildings were damaged or destroyed, and eight people were injured. Two tornadoes touched down at 6:35 p.m., one touched down south of Salem, Ohio and moved to southwest of Waterford, Ohio. Numerous homes and farm buildings were destroyed, damage estimates were in excess of \$5 million. The second tornado touched down southwest of Pennfield, Pennsylvania, became a maxi-tornado leaving a 69 mile (111 km) path of devastation to seven miles (11.3 km) northeast of Lock Haven, Pennsylvania. Most of the path was through the Moshannon State Forest, accounting for the lack of fatalities and injuries. Tree damage was extensive; it was estimated that 88,000 trees were destroyed. Thirteen homes were destroyed, and several coal mining operations were damaged. The Perma Grain Plant in Karthaus was damaged. The plant houses a nuclear reactor which shut down without a problem, and there were no radiation leaks. Holes were knocked in the roof and walls of the plant, a fire broke out inside, but the storage pool for nuclear fuel was unharmed. At 6:50 p.m., a twister touched down in Muskingum County, Ohio, and moved into Coshocton County, Ohio. Numerous homes and farm buildings were destroyed. Damage was in excess of \$500,000. Two inch (5.1 cm) hail was reported in Pike Township. At 6:54 and 6:56 p.m., two tornadoes touched down near Emlenton, Pennsylvania, causing minor damage and injuries to two people. A tornado touched down at 7 p.m., four miles (6.4 km) south of Sheffield, Pennsylvania and moved east to six miles (9.7 km) east-northeast Instanter, Pennsylvania. Except for the two miles (3.2 km) through Kane, damage was restricted to trees. In Kane the high school and middle school were damaged to the extent of \$4 million, and additional \$15 million damages were inflicted to businesses and residential areas. Four people were killed and forty people were injured. At 7:10 p.m., a tornado touched down two miles (3.2 km) west of Darlington, Pennsylvania, and passed north of Beaver Falls through southern portions of Zellenople, Evans City and Saxonburg and ended one mile (1.6 km) south of Sarver, Pennsylvania. There were nine deaths and 120 people were injured. Damage was estimated to be in excess of \$13 million. A mini tornado touched down at 7:45 p.m., in a rural area near East Sparta, Ohio damaging trees and several farm buildings. At 8:05 p.m., in Adams County, Ohio, a tornado touched down in a wooded area causing minor tree damage. A tornado touched down at 8:25 p.m., and left a 20 mile (32.2 km) path of destruction through Lycoming, Union and Northumberland, Pennsylvania. One hundred-ninety structures and 50 vehicles were destroyed or damaged. Thousands of trees were uprooted. Six people were killed and 60 people were injured. Near Norfolk, New York, at 8:30 p.m., a weak tornado touched down destroying a horse barn, garage, silo and downed several trees. A tornado touched down at 8:53 p.m., seven miles (11.3 km) southeast of Pen Run, Pennsylvania. Damage was limited to trees. A tornado touched down at 9:45 p.m.; its path extended from near Wapwallopen, Pennsylvania, to near Freeland, Pennsylvania. A barn, and several mobile homes were demolished. The final

# GENERAL SUMMARY OF TORNADOES

tornado of the super outbreak caused minor damage as it touched down momentarily at 11:05 p.m., near Tobyhanna, Pennsylvania. In summary: the storm system spawned 30 tornadoes, during a period of just over seven hours. Seventy-six people were killed and another 869 people were injured. Thirteen additional tornadoes were spawned by the same system between Lake Ontario and Georgian Bay, Canada.

On June 8th, a killer tornado touched down one mile (1.6 km) west of Park Falls, Wisconsin, and moved through the southern portion of the city. One hundred thirty-seven buildings were damaged or destroyed. Twenty-six people were injured. The tornado moved southeastward to Wintergreen Lake where several homes were destroyed and 34 others were damaged. The twister then moved 18 miles (29 km) southeast through Pierce County into Oneida County and moved to Cedar Falls resort area at Lake Swansuager, killing two people and injuring 16 others. Numerous resort buildings were damaged and 38 recreational vehicles were heavily damaged or destroyed. The tornado moved through thousands of acres of timber, blocking roads with debris, prior to moving across the southwest portion of Rhinelander, then dissipating just southeast of Monico, Wisconsin. Ninety homes were damaged or destroyed. Estimates of total damage exceeded \$6 million. In addition, 19,900 acres of timber and cranberry bogs were destroyed. Large hail up to 6 inches (15.2 cm) in diameter were reported at various locations along the tornado path.

On August 12th a tornado touched down one mile (1.6 km) south of Kendall, Wisconsin and moved northeastward into New Lisbon ripping through a trailer court on the northern edge of town before dissipating on the north edge of Castle Rock Lake. Two people were killed and 22 persons were injured when the tornado struck the trailer court. Damage exceeded \$625,000.

Twenty-one tornadoes were spawned on August 16th in northern Alabama. Extensive damage resulted to numerous homes, schools, commercial buildings and automobiles. One person was killed and 16 others were injured.

On September 23rd, a line of thunderstorms swept across the coastal areas of Alabama and Mississippi, spawning six tornadoes, three in each state. Damage was light, but six people were injured in Alabama. The heavy thunderstorms dumped nearly seven inches (17.8 cm) of rain in seven hours, which caused extensive flooding in Harrison County, Mississippi.

On November 18th, a strong tornado touched down one mile (1.6 km) north of Ralph, Arkansas and left a 34 mile (54.7 km) path of destruction to the north side of Lake Norfolk. One junior high school, three churches, seven businesses, 25 mobile homes and 143 houses were either destroyed or damaged. Total damages were estimated at \$7 million. Three people were killed and 16 people were injured.

On December 11th, at 1:25 p.m., the final tornado of the 1985 season touched down in Saint Tammany Parish, Louisiana destroying a small building, and damaging a house and one mobile home.

Additional information is presented in the following tables and charts. Continuing efforts in data collection by the National Severe Storms Forecast Center, Weather Service Offices, the University of Chicago, and the National Climatic Data Center have resulted in several corrections to previous tables.

More detailed information concerning tornado activity can be obtained from monthly Storm Data publications. The National Severe Storms Forecast Center has generated a magnetic tape which contains tornado statistics for the period 1950-1985. A copy of that tape can be obtained by contacting the National Climatic Data Center, Federal Building, Asheville, North Carolina 28801-2696 (Telephone: (704) 259-0682).

## TORNADO SUMMARY, 1985

STATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	ANN
<b>ALABAMA</b>													
Number	1	1		7	2	1	1	22	3	3	1		42
Days	1	1		2	1	1	1	2	1	2	1		13
Deaths								1					1
Injuries				11				16	4				31
<b>ARIZONA</b>													
Number			3										3
Days			1										1
Deaths													0
Injuries													0
<b>ARKANSAS</b>													
Number				4	2		1		1		2		10
Days				1	2		1		1		1		6
Deaths											3		3
Injuries											16		16
<b>CALIFORNIA</b>													
Number		1	1						1				3
Days		1	1						1				3
Deaths													0
Injuries													0
<b>COLORADO</b>													
Number				1	5	9	9	2					26
Days				1	3	5	6	2					17
Deaths													0
Injuries							8						8
<b>CONNECTICUT</b>													
Number						1		1					2
Days						1		1					2
Deaths													0
Injuries													0
<b>FLORIDA</b>													
Number	1	1	5		5	2	3	9	2	7			35
Days	1	1	3		4	2	3	4	2	3			23
Deaths			2										2
Injuries			48				1	1		6			56
<b>GEORGIA</b>													
Number				6		2	1	2					11
Days				2		2	1	1					6
Deaths													0
Injuries				16									16
<b>HAWAII</b>													
Number									1				1
Days									1				1
Deaths													0
Injuries													0
<b>IDAHO</b>													
Number				1	1				1				3
Days				1	1				1				3
Deaths													0
Injuries													0
<b>ILLINOIS</b>													
Number			2	2	1	2	3		1		4		15
Days			2	1	1	2	3		1		2		12
Deaths				1									1
Injuries				3			8						11
<b>INDIANA</b>													
Number			1	4	1	1			1				8
Days			1	1	1	1			1				5
Deaths													0
Injuries					2								2

## TORNADO SUMMARY, 1985

STATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	ANN
IOWA													
Number				2	7	8	1	8	1				27
Days				1	4	4	1	4	1				15
Deaths					2								2
Injuries					29	1			1				31
KANSAS													
Number			2	2	6	1	1	7					19
Days			2	2	2	1	1	4					12
Deaths													0
Injuries					1								1
KENTUCKY													
Number			2			3							5
Days			1			3							4
Deaths													0
Injuries													0
LOUISIANA													
Number				10	1			7			1	1	20
Days				3	1			5			1	1	11
Deaths													0
Injuries								1					1
MASSACHUSETTS													
Number									1				1
Days									1				1
Deaths													0
Injuries													0
MICHIGAN													
Number			1	1	3	3	1		2				11
Days			1	1	3	1	1		1				8
Deaths						1							1
Injuries				6									6
MINNESOTA													
Number				8	7	5	4		2				26
Days				2	5	3	2		2				14
Deaths													0
Injuries				5	1								6
MISSISSIPPI													
Number		2		1	6	1		3	6	2			21
Days		2		1	2	1		2	2	2			12
Deaths													0
Injuries					1								1
MISSOURI													
Number				3	7	3							13
Days				2	4	2							8
Deaths													0
Injuries					5								5
MONTANA													
Number					2								2
Days					1								1
Deaths													0
Injuries													0
NEBRASKA													
Number			4	15	14	4	2	6	7				52
Days			1	4	7	2	2	4	3				23
Deaths													0
Injuries					7								7
NEW JERSEY													
Number									1	1			2
Days									1	1			2
Deaths													0
Injuries										8			8

## TORNADO SUMMARY, 1985

STATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	ANN
<b>NEW MEXICO</b>													
Number					1	1	2		1				5
Days					1	1	2		1				5
Deaths													0
Injuries													0
<b>NEW YORK</b>													
Number				1	3		1	1		2			8
Days				1	1		1	1		1			5
Deaths													0
Injuries					10					6			16
<b>NORTH CAROLINA</b>													
Number					2	1		3			2		8
Days					2	1		2			1		6
Deaths													0
Injuries								7					7
<b>NORTH DAKOTA</b>													
Number				1	10	9	1	9	2				32
Days				1	3	2	1	4	1				12
Deaths													0
Injuries													0
<b>OHIO</b>													
Number			6		12	2							20
Days			2		2	1							5
Deaths					11								11
Injuries					340	2							342
<b>OKLAHOMA</b>													
Number		2	5	10	6	5	1		3		4		36
Days		2	3	5	4	3	1		1		4		23
Deaths													0
Injuries		3	12	4	3						13		35
<b>PENNSYLVANIA</b>													
Number					21	7	4	1					33
Days					1	4	2	1					8
Deaths					65								65
Injuries					527		2						529
<b>RHODE ISLAND</b>													
Number								1					1
Days								1					1
Deaths													0
Injuries													0
<b>SOUTH CAROLINA</b>													
Number				1		2		4			2		9
Days				1		2		1			2		6
Deaths													0
Injuries						4		39					43
<b>SOUTH DAKOTA</b>													
Number				12	27		4	10	2				55
Days				2	4		2	5	1				14
Deaths													0
Injuries													0
<b>TENNESSEE</b>													
Number				2		1		5			2		10
Days				2		1		2			1		6
Deaths													0
Injuries								1					1
<b>TEXAS</b>													
Number			5	41	28	5	3	1	1	3	1	2	90
Days			2	9	10	5	2	1	1	3	1	1	35
Deaths				4									4
Injuries				2	47					2		3	54

## TORNADO SUMMARY, 1985

STATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	ANN
VIRGINIA													
Number							3						3
Days							1						1
Deaths													0
Injuries													0
WASHINGTON													
Number			1					1					2
Days			1					1					2
Deaths													0
Injuries													0
WEST VIRGINIA													
Number							1						1
Days							1						1
Deaths													0
Injuries													0
WISCONSIN													
Number					7	3	1	5					16
Days					3	2	1	2					8
Deaths						2		2					4
Injuries					3	42		36					81
WYOMING													
Number					2	1	3	1					7
Days					2	1	2	1					6
Deaths													0
Injuries													0
UNITED STATES													
Number	2	7	38	134*	182*	82*	51	108*	40	18	19	3	684*
Days †	2	4	12	19	28	24	19	26	16	8	8	2	168
Deaths	0	0	2	5	78	3	0	3	0	0	3	0	94
Injuries	0	3	60	47	976	49	19	101	5	22	29	3	1314

\* Corrected for boundary-crossing tornadoes.

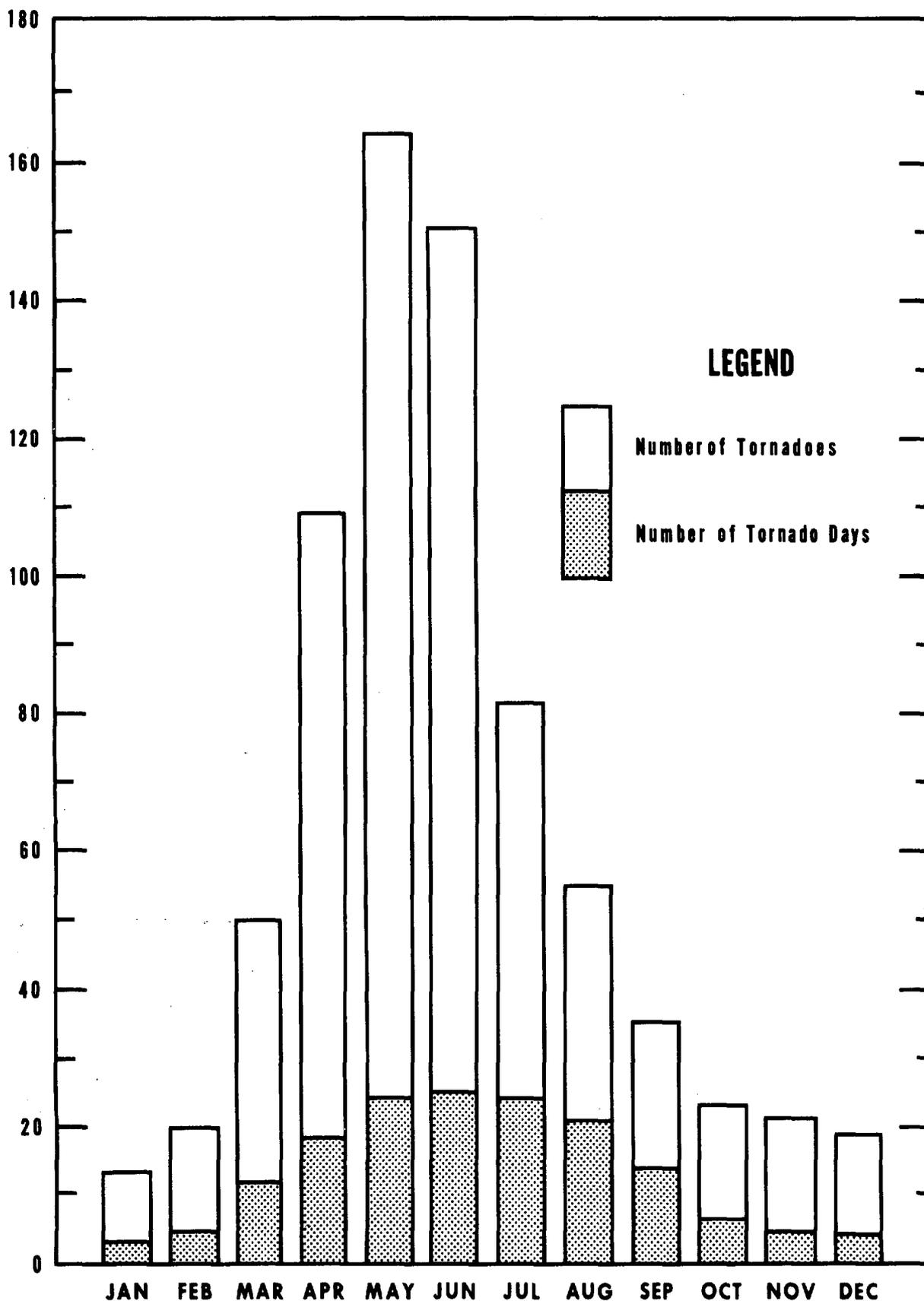
† Tornado days for country as a whole.

NUMBER OF TORNADOES, TORNADO DAYS, AND DEATHS BY MONTHS, 1953-85

YEAR	JANUARY			FEBRUARY			MARCH			APRIL			MAY			JUNE			JULY			AUGUST			SEPTEMBER			OCTOBER			NOVEMBER			DECEMBER			ANNUAL		
	NUMBER	DAYS	DEATHS	NUMBER	DAYS	DEATHS	NUMBER	DAYS	DEATHS	NUMBER	DAYS	DEATHS	NUMBER	DAYS	DEATHS	NUMBER	DAYS	DEATHS	NUMBER	DAYS	DEATHS	NUMBER	DAYS	DEATHS	NUMBER	DAYS	DEATHS	NUMBER	DAYS	DEATHS	NUMBER	DAYS	DEATHS	NUMBER	DAYS	DEATHS			
1953	14	6	0	16	3	3	40	10	24	47	16	34	94	21	161	111	24	244	31	19	0	24	15	0	5	4	0	6	4	0	12	6	0	21	8	49	421	136	515
1954	2	1	0	17	9	2	63	13	10	112	22	3	101	22	9	107	26	5	45	23	0	49	21	1	21	10	3	14	8	2	2	2	0	17	3	1	550	160	36
1955	3	2	0	4	3	0	43	15	5	99	18	7	147	26	103	154	28	2	49	21	5	33	18	0	15	8	2	23	7	1	20	4	1	3	2	0	593	152	126
1956	2	2	0	47	12	8	31	7	1	85	15	67	79	24	4	65	21	0	91	26	1	43	20	2	16	10	0	29	8	0	7	6	0	9	4	0	504	155	83
1957	17	3	13	5	3	0	38	7	1	216	21	29	227	26	87	147	25	14	55	19	0	20	14	0	17	10	2	18	11	2	58	11	25	38	4	19	856	154	192
1958	12	7	0	20	5	13	15	10	0	76	19	4	68	21	0	127	27	42	121	30	1	46	20	1	24	14	1	9	6	4	45	6	0	1	1	0	564	166	66
1959	16	2	3	20	5	21	43	11	9	30	12	1	226	28	8	73	25	2	63	24	0	38	18	0	58	15	14	24	10	0	11	4	0	2	2	0	604	156	58
1960	9	4	0	28	10	0	28	10	0	70	20	7	201	26	34	124	27	3	43	22	0	47	23	1	22	13	0	18	10	1	25	6	0	1	1	0	616	172	46
1961	1	1	0	31	8	0	124	17	7	74	19	3	137	25	23	107	23	2	77	27	0	27	16	0	53	16	15	14	5	0	36	7	1	16	5	0	697	169	51
1962	12	3	1	25	7	0	37	9	17	41	8	1	200	22	3	171	29	0	78	26	0	51	21	6	24	11	0	11	10	0	5	4	0	2	2	0	657	152	28
1963	15	5	1	6	3	0	48	12	8	84	14	16	71	21	1	91	23	0	62	26	0	26	13	2	33	13	3	13	5	0	15	6	0	0	0	0	464	141	31
1964	14	3	10	2	2	0	36	11	6	157	23	15	135	20	16	136	24	0	63	23	0	79	23	2	25	10	0	22	4	22	17	8	0	18	5	2	704	156	73
1965	21	11	0	32	4	0	34	9	2	129	20	264	275	25	17	147	28	6	86	26	0	61	23	1	64	21	0	16	4	1	34	6	5	7	4	0	906	181	296
1966	1	1	0	28	5	0	12	6	58	80	20	12	98	17	0	126	28	19	100	27	3	58	21	0	22	13	0	29	6	6	20	3	0	11	3	0	585	150	98
1967	39	4	7	8	5	0	42	14	3	149	18	73	116	25	3	210	28	6	90	25	1	28	16	2	139	16	5	36	7	4	8	5	0	61	10	10	926	173	114
1968	5	3	0	7	3	0	28	8	0	102	15	40	145	26	72	136	27	11	56	22	2	66	23	2	25	14	0	14	9	0	44	12	3	32	9	1	660	171	131
1969	3	1	32	5	5	0	8	2	1	68	15	2	145	25	4	137	28	7	99	27	0	69	21	19	20	11	0	26	10	0	5	3	0	23	7	1	608	155	66
1970	9	5	0	16	3	0	25	12	2	117	16	29	88	19	26	134	24	6	81	26	3	55	21	0	54	20	0	50	13	6	10	4	0	14	8	0	653	171	72
1971	18	7	1	83	12	131	40	13	2	75	14	11	166	24	7	199	28	1	100	30	1	50	21	0	47	15	0	38	12	0	16	7	0	56	9	2	888	192	156
1972	33	10	5	7	4	0	69	17	0	96	20	16	140	27	0	114	25	2	115	29	0	59	23	2	49	19	0	34	10	0	17	4	2	8	6	0	741	194	27
1973	33	7	1	10	4	0	80	16	17	150	22	10	250	26	35	224	26	2	80	26	0	51	23	4	69	22	3	25	11	0	81	11	12	49	12	3	1102	206	87
1974	24	8	2	23	9	0	36	12	1	269	22	313	144	28	10	194	26	31	59	19	0	107	26	0	25	11	0	45	10	4	13	8	0	8	5	0	947	184	361
1975	52	7	12	45	12	7	84	16	12	108	20	13	188	30	5	196	28	6	79	26	2	60	25	2	34	17	0	12	7	0	40	8	0	22	8	1	920	204	60
1976	12	5	0	37	6	5	180	18	21	113	23	1	155	24	8	169	26	3	84	28	2	38	18	1	35	15	3	11	5	0	0	0	0	1	1	0	835	169	44
1977	5	4	0	17	3	2	64	15	0	88	15	26	228	29	4	132	27	0	99	27	1	82	26	6	65	21	1	25	5	1	24	10	0	23	7	2	852	189	43
1978	23	7	2	6	3	0	17	8	0	107	17	4	213	27	7	148	28	17	143	30	11	65	24	1	20	10	6	7	5	0	9	5	0	30	9	5	788	173	53
1979	16	9	0	4	3	0	53	13	1	120	17	58	112	23	2	150	24	8	132	30	1	127	27	5	68	19	2	47	12	7	21	8	0	2	1	0	852	186	84
1980	5	4	0	11	9	0	41	15	2	137	16	4	203	25	8	217	30	7	95	26	5	73	27	0	37	14	1	43	7	1	3	2	0	1	1	0	866	176	28
1981	3	3	0	25	5	2	33	13	1	84	18	13	187	24	0	223	29	8	98	27	0	64	22	0	26	16	0	32	12	0	7	5	0	1	1	0	783	175	24
1982	18	8	1	3	2	0	60	15	6	150	20	30	327	28	14	198	30	4	95	29	0	34	15	0	38	12	2	9	4	0	19	6	0	95	13	7	1046	182	64
1983	13	2	2	41	7	1	71	21	0	65	15	6	249	26	14	178	27	2	99	27	4	76	21	0	20	15	0	12	5	0	49	11	0	58	13	5	931	190	34
1984	1	1	0	27	4	0	73	15	64	176	22	33	169	27	6	242	25	14	72	21	0	47	20	0	17	12	0	49	12	4	30	5	1	4	2	0	907	166	122
1985	2	2	0	7	4	0	38	12	2	134	19	5	182	28	78	82	24	3	51	19	0	108	26	3	40	16	0	18	8	0	19	8	3	3	2	0	684	168	94
1953-1985	453	148	93	663	182	195	1634	402	283	3608	591	1150	5466	815	769	4969	868	477	2691	833	43	1861	691	63	1227	463	63	779	262	66	722	201	53	637	168	108	24710	5624	3363
MEAN	14	4	3	20	6	6	50	12	9	109	18	35	166	25	23	151	26	14	82	25	1	56	21	2	37	14	2	24	8	2	22	6	2	19	5	3	749	170	102

# AVERAGE NUMBER OF TORNADOES AND TORNADO DAYS EACH MONTH IN THE UNITED STATES

(BASED ON 24,710 TORNADOES THAT OCCURRED FROM 1953-1985)



## NUMBER OF TORNADES, TORNADO DAYS, AND DEATHS BY STATES, 1953-1985

STATE	TORNADES							DAYS		DEATHS		
	TOTAL	AVER- AGE	GREAT- EST	YEAR	LEAST	YEAR	Per # 10,000 Sq. Mi.	TOTAL	AVER- AGE	TOTAL	AVER- AGE	Per @ 10,000 Sq. Mi.
ALABAMA	728	22	45	1983+	5	1956	4.27	381	12	213	6	41
ALASKA	1	0	1	1959	0	1985	.00	1	0	0	0	0
ARIZONA	116	4	17	1972	0	1965+	.31	94	3	3	0	0
ARKANSAS	708	21	78	1982	2	1969+	4.04	318	10	151	5	28
CALIFORNIA	127	4	14	1982	0	1986+	.24	93	3	0	0	0
COLORADO	642	19	58	1982	1	1959	1.87	398	12	2	0	0
CONNECTICUT	46	1	8	1973	0	1981	2.78	42	1	4	0	8
DELAWARE	30	1	5	1975	0	1985+	4.42	27	1	2	0	10
DISTRICT OF COLUMBIA	0	0	0		0	1985+	.00	0	0	0	0	0
FLORIDA	1435	43	97	1975	10	1956	7.43	916	28	61	2	10
GEORGIA	690	21	46	1974+	7	1960	3.55	387	12	72	2	12
HAWAII	22	1	4	1971	0	1984+	1.04	18	1	0	0	0
IDAHO	49	1	5	1967	0	1977	.18	41	1	0	0	0
ILLINOIS	881	27	107	1974	4	1953	4.73	410	12	147	4	26
INDIANA	670	20	48	1973	4	1982	5.59	329	10	205	6	56
IOWA	948	29	61	1984	7	1956	5.10	429	13	59	2	10
KANSAS	1422	43	97	1955	14	1976	5.24	663	20	168	5	20
KENTUCKY	265	8	34	1974	0	1953	1.99	156	5	101	3	25
LOUISIANA	719	22	22	1964	3	1955	4.49	439	13	93	3	19
MAINE	72	2	11	1971	0	1985+	.66	64	2	1	0	0
MARYLAND	88	3	10	1975	0	1985+	2.52	68	2	2	0	2
MASSACHUSETTS	114	3	12	1958	0	1982+	4.18	83	3	99	3	120
MICHIGAN	519	16	39	1974	2	1959	2.70	302	9	234	7	40
MINNESOTA	597	18	41	1981	5	1972	2.15	334	10	76	2	9
MISSISSIPPI	695	21	44	1973	1	1979	4.41	373	11	335	10	70
MISSOURI	943	29	79	1973	6	1953	4.10	415	13	131	4	19
MONTANA	131	4	13	1971	0	1974+	.27	99	3	1	0	0
NEBRASKA	1155	35	78	1975	10	1966	4.53	563	17	49	1	6
NEVADA	22	1	4	1964	0	1985+	.06	21	1	0	0	0
NEW HAMPSHIRE	64	2	9	1963	0	1985+	2.08	56	2	0	0	0
NEW JERSEY	51	2	8	1973	0	1984+	1.97	43	1	0	0	0
NEW MEXICO	256	8	18	1956	0	1953	.64	198	6	3	0	0
NEW YORK	128	4	8	1985+	0	1953	.78	100	3	5	0	1
NORTH CAROLINA	398	12	38	1973	2	1970	2.29	249	8	67	2	13
NORTH DAKOTA	578	18	52	1976	2	1961	2.48	326	10	21	1	3
OHIO	468	14	43	1973	3	1966+	3.44	244	7	164	5	40
OKLAHOMA	1832	56	107	1957	21	1978	7.94	751	23	199	6	28
OREGON	31	1	4	1984	0	1985+	.10	27	1	0	0	0
PACIFIC	2	0	1	1981+	0	1985+	--	2	0	0	0	0
PENNSYLVANIA	296	9	33	1985+	0	1959	1.98	191	6	73	2	16
PUERTO RICO	9	0	2	1979+	0	1985+	.80	8	0	0	0	0
RHODE ISLAND	2	0	1	1985+	0	1984+	.50	2	0	0	0	0
SOUTH CAROLINA	312	9	23	1973	1	1970+	3.04	207	6	39	1	13
SOUTH DAKOTA	848	26	64	1965	1	1958	3.34	404	12	8	0	1
TENNESSEE	380	12	44	1974	1	1962	2.73	203	6	75	2	18
TEXAS	4092	124	232	1967	32	1953	4.64	1620	49	399	12	15
UTAH	43	1	6	1984	0	1985+	.15	35	1	0	0	0
VERMONT	26	1	5	1962	0	1985+	.82	23	1	0	0	0
VIRGINIA	187	6	22	1975	1	1982+	1.39	126	4	16	0	4
VIRGIN ISLANDS	2	0	1	1979+	0	1985+	--	2	0	0	0	0
WASHINGTON	44	1	4	1983+	0	1977+	.20	37	1	6	0	0
WEST VIRGINIA	66	2	6	1980+	0	1984+	.83	51	2	2	0	1
WISCONSIN	632	19	43	1980	3	1953	3.41	336	10	75	2	8
WYOMING	303	9	42	1979	0	1970	.94	207	6	2	0	0
TOTAL: UNITED STATES	24710*	749	1102	1973	421	1953	2.07	5618†	170	3363	102	9

+ Also in earlier year(s).

\* Corrected for boundary-crossing tornadoes.

† Tornado days for country as a whole.

# Mean annual tornadoes per 10,000 square miles.

@ Number of deaths per 10,000 square miles.

**NUMBER OF TORNADES, TORNAO DAYS, DEATHS, AND RESULTING LOSSES BY YEARS, 1916-1985**

YEAR	Number Tornadoes	Tornado Days	Total Deaths	Most Deaths in Single Tornado	Total Property Losses †	PROPERTY LOSS FREQUENCY*		
						Category 5	Category 6	Category 7 and Over
1916	90	36	150	30	6	7	1	0
1917	121	38	551	101	7	21	9	0
1918	81	45	136	36	7	20	5	0
1919	64	35	206	59	7	10	2	0
1920	87	50	499	87	7	14	10	0
1921	105	55	202	61	7	22	3	0
1922	108	64	135	16	7	27	5	0
1923	102	59	110	23	6	21	1	0
1924	130	57	376	85	7	26	11	1
1925	119	65	794	689	7	34	2	1
1926	111	57	144	23	6	28	0	0
1927	163	62	540	92	7	42	9	1
1928	203	79	95	14	7	40	7	0
1929	197	74	274	40	7	48	4	0
1930	192	72	179	41	7	38	6	0
1931	94	57	36	6	6	14	1	0
1932	151	67	394	37	7	23	1	1
1933	258	96	362	34	7	46	9	0
1934	147	77	47	6	6	10	3	0
1935	180	77	71	11	6	29	0	0
1936	151	71	552	216	7	17	5	1
1937	147	75	29	5	6	24	0	0
1938	213	76	183	32	7	29	6	0
1939	152	75	91	27	7	21	3	0
1940	124	62	65	18	7	13	2	0
1941	118	57	53	25	6	24	1	0
1942	167	66	384	65	7	42	10	0
1943	152	61	58	5	7	28	8	0
1944	169	68	275	100	7	50	9	0
1945	121	66	210	69	7	21	10	1
1946	106	65	78	15	7	29	7	0
1947	165	78	313	169	7	46	7	1
1948	183	68	139	33	7	62	11	2
1949	249	80	211	58	7	54	13	0
1950	200	88	70	18	7	47	9	0
1951	262	113	34	6	7	35	11	2
1952	240	98	229	57	7	53	19	0
1953	421	136	515	116	8	63	18	7
1954	550	160	36	6	7	63	8	1
1955	593	152	126	80	7	74	13	1
1956	504	155	83	25	7	83	24	1
1957	856	154	192	44	8	129	26	3
1958	564	166	66	19	7	70	8	1
1959	604	156	58	21	7	70	4	1
1960	616	172	46	16	7	65	11	1
1961	697	169	51	16	7	103	21	1
1962	657	152	28	17	7	51	10	0
1963	464	141	31	5	7	77	15	1
1964	704	156	73	22	7	113	17	5
1965	906	181	296	44	8	126	30	11
1966	585	150	98	58	8	79	13	4
1967	926	173	114	33	8	125	33	8
1968	660	171	131	34	8	82	26	6
1969	608	155	66	32	8	98	16	3
1970	653	171	72	26	8	97	24	6
1971	888	192	156	58	8	71	30	5
1972	741	194	27	6	8	100	28	1
1973	1102	206	87	7	9	219	67	9
1974	947	184	361	34	9	166	82	25
1975	920	204	60	9	9	189	31	11
1976	835	169	44	5	8	145	41	5
1977	852	189	43	22	8	173	40	6
1978	788	173	53	16	9	153	53	6
1979	852	186	84	42	9	169	62	11
1980	866	176	28	5	9	201	79	13
1981	783	175	24	5	9	144	43	12
1982	1046	182	64	10	9	254	79	13
1983	931	190	34	3	9	211	85	10
1984	907	166	122	16	9	193	90	35
1985	684	168	94	18	9	114	55	14
Means: 1953- 1985	749	170	102	---	---	123	36	7

NOTE: -- The above estimated losses are based on values at time of occurrence.

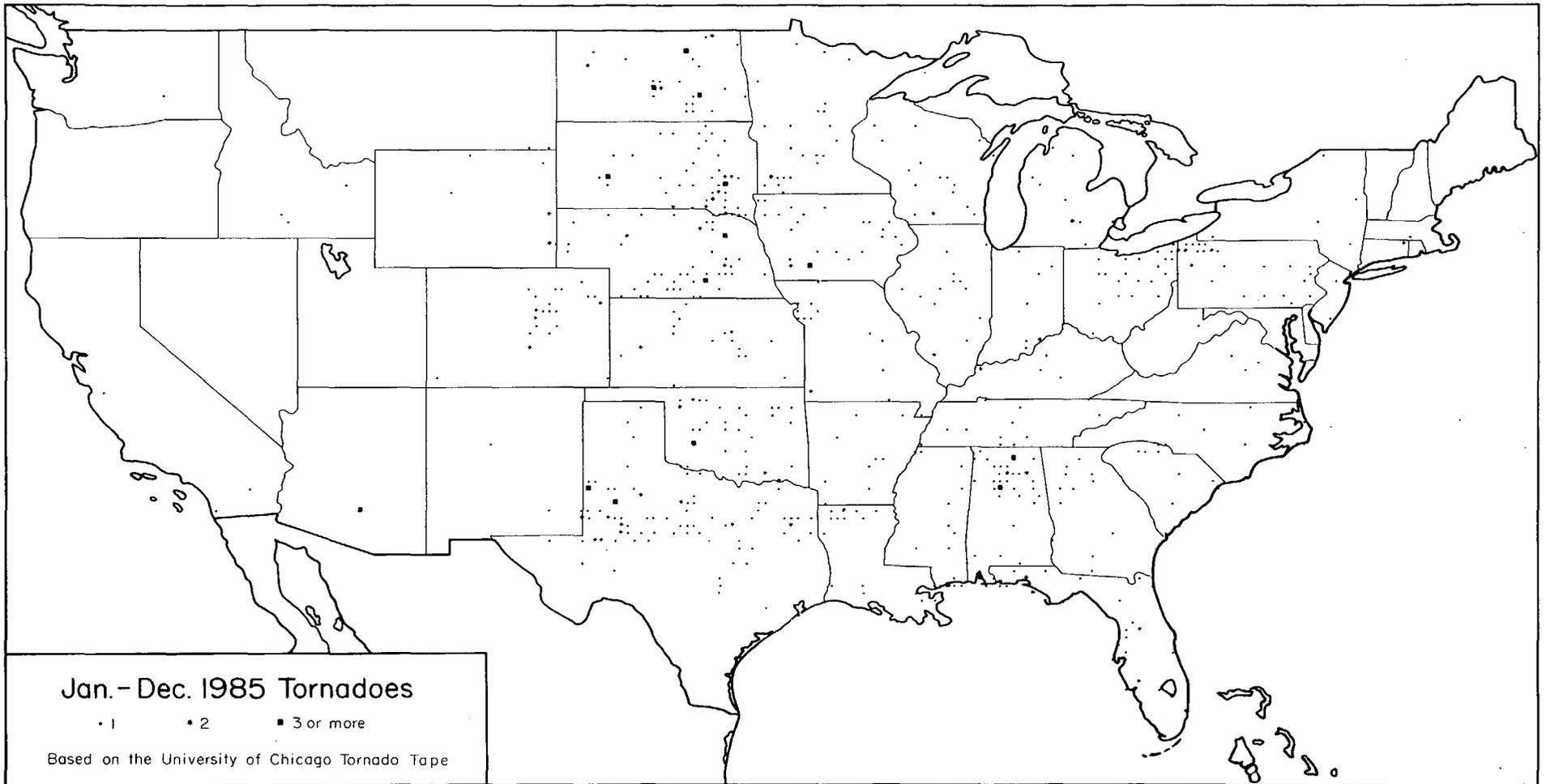
† Storm damages in categories:

- 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 and over

\*Number of times property losses reported in Storm Data in Categories 5, 6, 7, and over.

## NUMBER OF FUNNEL CLOUDS, 1985

STATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	ANN
ALABAMA			3	5	5	3		6		1			23
ALASKA													0
ARIZONA									3				3
ARKANSAS				1	3		2	3					9
CALIFORNIA		2											2
COLORADO							3						3
CONNECTICUT							3	1					4
DELAWARE													0
DISTRICT OF COLUMBIA													0
FLORIDA							3	3					6
GEORGIA						2	1	2					5
HAWAII													0
IDAHO					3				1				4
ILLINOIS					1	4	2	2					9
INDIANA			4		1		1						6
IOWA				6	7	14	4	11					42
KANSAS				49	1	3		3					56
KENTUCKY						5							5
LOUISIANA					1								1
MAINE													0
MARYLAND													0
MASSACHUSETTS					4		1						5
MICHIGAN					4	2	4	25	38				73
MINNESOTA				3	9	14	5		1				32
MISSISSIPPI			4	3		1		2	1				11
MISSOURI													0
MONTANA					1								1
NEBRASKA			2	11	2	6	1	11	1				34
NEVADA						1							1
NEW HAMPSHIRE													0
NEW JERSEY													0
NEW MEXICO						3							3
NEW YORK					3								3
NORTH CAROLINA						4	2	1					7
NORTH DAKOTA					13	14		35	1				63
OHIO									1				1
OKLAHOMA		1	7	7	7	8			1				31
OREGON													0
PACIFIC													0
PENNSYLVANIA							9		5				14
PUERTO RICO													0
RHODE ISLAND													0
SOUTH CAROLINA													0
SOUTH DAKOTA				6	25	1	4	7					43
TENNESSEE				1	2		2						5
TEXAS		1	1	22	29	6	6			4	1		70
UTAH					1		4						5
VERMONT													0
VIRGINIA			1				1						2
VIRGIN ISLANDS													0
WASHINGTON				1									1
WEST VIRGINIA													0
WISCONSIN					6	2							8
WYOMING						1	6	1					8
TOTAL: UNITED STATES		4	22	115	128	94	64	113	53	5	1		599



# GENERAL SUMMARY OF LIGHTNING, 1985

HENRY N. VIGANSKY  
 NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
 NATIONAL ENVIRONMENTAL SATELLITE, DATA, AND INFORMATION SERVICE  
 NATIONAL CLIMATIC DATA CENTER

Lightning killed 73 people and injured 248 during 1985. Eighty-six percent of the fatalities occurred between the hours of 10 a.m., and 10 p.m., local standard time. Increases (from the national average) in deaths occurred in the following locations: open fields (34 percent versus 27 percent); boating, fishing and water related (22 percent versus 13 percent); and under trees (19 percent versus 16 percent). For comparative purposes, the number, location and percentage frequency of lightning fatalities and injuries are summarized in Table I.

TABLE I  
LOCATION, NUMBERS AND PERCENTAGE FREQUENCY OF LIGHTNING DEATHS AND INJURIES

<u>LOCATION</u>	<u>NUMBER (PERCENTAGE FREQUENCY)</u>		1985	
	<u>DEATHS</u>	<u>INJURIES</u>	<u>DEATHS</u>	<u>INJURIES</u>
Open fields, ball fields, etc.	727 (27)	1995 (30)	25 (34)	111 (45)
Under trees	425 (16)	862 (13)	14 (19)	37 (15)
Boating, fishing and water related	342 (13)	372 (6)	16 (22)	10 (4)
Tractors, heavy road equipment, etc.	161 (6)	186 (3)	3 (4)	4 (2)
Golf courses	120 (5)	318 (5)	4 (5)	11 (4)
Telephones	30 (1)	181 (3)	1 (1)	4 (2)
Various other and unknown locations	842 (32)	2806 (40)	10 (15)	71 (28)

For the period 1959-1985 an average of five percent of the nations lightning fatalities and/or injuries occur on golf courses. One hundred twenty people have been killed and 318 people have been injured by lightning on golf courses. Michigan recorded 10 percent of all lightning deaths reported on golf courses, followed by Pennsylvania with nine percent, New York seven percent, Ohio six percent, and North Carolina, Tennessee, and Wisconsin each recording five percent. These seven states represent 47% of all lightning fatalities and 41% of the lightning injuries recorded on golf courses in the United States for the past 27 years. No deaths or injuries have been reported on golf courses in the following states: Alaska, California, Delaware, Hawaii, Idaho, Nevada, Oregon and Vermont. Table II, depicts a breakdown by state of total lightning deaths and injuries on golf courses for the period 1959-1985:

TABLE II  
GOLF COURSE ASSOCIATED LIGHTNING DEATHS AND INJURIES  
 FOR THE UNITED STATES 1959-1985

<u>RANK</u>	<u>STATE</u>	<u>DEATHS</u>	<u>INJURIES</u>	<u>RANK</u>	<u>STATE</u>	<u>DEATHS</u>	<u>INJURIES</u>
1.	MICHIGAN	12	38	23.	ALABAMA	1	3
2.	PENNSYLVANIA	11	11	24.	DISTRICT OF COLUMBIA	1	1
3.	NEW YORK	8	12	25.	KENTUCKY	1	10
4.	OHIO	7	31	26.	LOUISIANA	1	0
5.	NORTH CAROLINA	6	20	27.	MASSACHUSETTS	1	4
6.	TENNESSEE	6	11	28.	MINNESOTA	1	9
7.	WISCONSIN	6	7	29.	MISSOURI	1	1
8.	COLORADO	5	15	30.	NEW HAMPSHIRE	1	4
9.	FLORIDA	5	22	31.	NEW MEXICO	1	3
10.	ILLINOIS	5	13	32.	NORTH DAKOTA	1	2
11.	NEW JERSEY	5	5	33.	SOUTH DAKOTA	1	0
12.	CONNECTICUT	4	4	34.	VIRGINIA	1	3
13.	GEORGIA	4	21	35.	WEST VIRGINIA	1	4
14.	ARIZONA	3	0	36.	UTAH	1	4
15.	INDIANA	3	11	37.	MAINE	0	1
16.	SOUTH CAROLINA	3	4	38.	MARYLAND	0	3
17.	TEXAS	3	1	39.	MONTANA	0	3
18.	ARKANSAS	2	4	40.	NEBRASKA	0	5
19.	IOWA	2	4	41.	RHODE ISLAND	0	2
20.	KANSAS	2	10	42.	WASHINGTON	0	1
21.	MISSISSIPPI	2	1	43.	WYOMING	0	3
22.	OKLAHOMA	2	7		TOTAL	120	318

## GENERAL SUMMARY OF LIGHTNING

Some lightning incidents are briefly described in the following monthly summary:

FEBRUARY -- Lightning struck a large tree, formed into a fireball, and then rolled into a home in Saint George, Kansas. The fireball created by the lightning strike was so bright that children at a school located two blocks away thought the lights had been switched on and off. The electrical surge was strong enough to cause telephones to ring all over town. The home's interior and contents were a total loss because of the resulting intense heat and smoke damage.

MARCH -- Lightning struck a shoe factory in Ripley, Ohio injuring 29 employees. All of the people were treated at hospitals and seven were admitted.

APRIL -- A man and his dog were struck by lightning and killed three miles (4.8km) northwest of Junction City, Kansas. The man was walking his dog. A young woman was struck by lightning while leaving Topsail Beach, North Carolina; she died two days later. Her boyfriend was slightly injured; he was holding her hand at the time she was struck by lightning. In Gatesville, Texas, two boys ducked under a tree to escape the rain when lightning struck killing the younger (15 years old) boy. The older (16 years old) boy was knocked unconscious. When he awoke, his legs were numb; he crawled 70 yards (64m) before feeling was restored in his legs which enabled him to walk. He had to continue on for another 150 yards (13.7m) to summon help.

MAY -- Lightning killed a man and injured his companion on a golf course in Battendorf, Iowa. Lightning struck a tree in Lake Nokomis Park, Minneapolis, Minnesota, sending an electrical charge down the tree and along the ground for 50 yards (45.7m). The electrical charge knocked a group of softball players off their feet. Six players had to be hospitalized, and one died the following day. In Saint Louis, Missouri, lightning killed one man and injured five others after they took shelter under a tree to ward off the rain. The group had been playing corkball. In Scotch Plains, New Jersey, a young man went in his grandmothers bedroom to make a telephone call. Several minutes later he was found dead with the telephone receiver next to his ear. The death bewildered forensic experts for months before they determined lightning was the cause of the boys death. Lightning struck on the soccer field in Beavercreek, Ohio, injuring 20 people, which included players, managers and a referee. One of the managers died in September as a result of his injuries. On Twin Valley Lake in Iowa County, Wisconsin, lightning struck an aluminum canoe and killed two men.

JUNE -- On Tombigbee River, in Washington County, Alabama, a man was killed by lightning while he and his wife were boating. The woman was knocked from her seat, but was not injured. A farmer was plowing a field near Augusta, Arkansas during a thunderstorm. A lightning bolt knocked the man completely off his tractor, killing him instantly. Lightning struck and killed a man and a teenage boy and injured another teenager as they stood under a tree at Lake Manawa State Park in Council Bluffs, Iowa. The mother of the dead youth was severely burned and died at a later date. At a golf course in Calvert City, Kentucky, lightning killed one person and injured another. In Falmouth, Massachusetts, a bizarre lightning death occurred when a bolt of lightning struck a house, broke a bedroom window and jumped to a metal bedframe, killing the man asleep in the bed. His wife was asleep in the same bed. She was not directly injured by the lightning, but sustained burns to her hands while attempting to put out the resulting fire. Moderate damage was confined to the bedroom. In Schuylkill County, Pennsylvania, a lightning strike traveled deep into a coal mine, setting off explosives and injuring five men. Twenty-four people were injured as a result of a lightning strike while attending a track-and-field event in Alexandria, Pennsylvania. In Memphis, Tennessee, lightning injured an elementary school teacher as she was walking to her car. Quick action by paramedics saved her life.

JULY -- In Yosemite National Park, California five hikers were on Half Dome Summit when lightning struck, killing two and injuring the other three hikers. On the same day in Sequoia National Park, California a single hiker on top of Moro Rock was struck and killed by lightning. In Lexington, Maine, a four piece band was struck by a lightning bolt that hit a dance hall where they were playing. The bolt traveled through the instruments burning three band members. The lead singer was knocked unconscious. Her heart stopped beating. Fortunately she survived the ordeal, because of the quick action of a patron who immediately administered cardiopulmonary resuscitation to her. Lightning struck a tree in Dearborn Heights, Michigan, killing two boys and injuring two other boys. Four men were injured by lightning on a golf course in East Lansing, Michigan. Two brothers were killed by lightning while fishing on a lake in Saline County, Missouri. A third person, who was fishing with the two brothers, was not injured. In North Ridgeville, Ohio, lightning ignited a lumber yard, the ensuing fire resulted in \$500,000 damages. A 10 year old was killed by lightning in a Boy Scout Camp located in Grundy County, Tennessee. Seven other scouts were injured. Lightning struck a tree; the charge traveled through the root system and the ground into the boys nearby tent. The boys were lying on metal cots. In Dallas County, Texas, a 15 year old boy was rolling up the windows of a car as a thunderstorm was approaching. Lightning struck the boy, killed him and injured his two companions. In Ector County, Texas, a 12 year old boy was struck by lightning and was not injured while riding in an automobile. He was rolling up a window, and was barefooted. The lightning passed through his body. He was taken to a local hospital; he had no visible signs of injury and all tests performed by the hospital staff turned out to be negative. Two men and a teenage boy were struck

## GENERAL SUMMARY OF LIGHTNING

by lightning on the Sweet Water Golf Course in Cache County, Utah. They had taken refuge under a tree to ward off the rain. One man was killed instantly. The other man was knocked unconscious and when he regained consciousness he was paralyzed. The youth received minor injuries.

AUGUST — In Washington County, New York, a farm hand was struck by lightning while walking to a barn. Lightning struck a baling machine as the victim was passing by. The lightning bolt passed through the young man's body stopping his heart. The rescue squad revived the man and rushed him to a local hospital. While enroute to the hospital the ambulance was struck by lightning which resulted in a fire and explosion. The medics were slightly injured and the farmhand died at the hospital. Three marines received minor injuries from a lightning bolt on Fort McCoy, Wisconsin.

SEPTEMBER — In McHenry County, Illinois, on Crystal Woods Golf Course, lightning struck a wooden shelter in which eight golfers had sought refuge from the storm. One golfer was killed and seven others were injured. On the same day in McHenry County, Illinois lightning struck a soccer goal post and traveled 25 feet (15.2 m) onto the playing field. One soccer player was killed and another one was injured. A 30 year old man died on November 26th, after being struck by lightning on September 27th. The man was walking on a sidewalk in Tucson, Arizona, when he was struck by lightning. The bolt struck him on the left side leaving a burn on his chest; he remained in a coma until his death. At Fort Belvoir, Virginia a 19 year old soldier was killed and five other soldiers were injured when lightning struck them in an open field.

OCTOBER — A guest on the top floor of a hotel in Seattle, Washington was seriously injured by lightning while talking on the telephone.

NOVEMBER -- The facade of a 12 story building was partially destroyed during a heavy thunderstorm. Part of the outer wall from the seventh to the tenth floors were sheared off. An eyewitness reported that the wall popped outward at the time when lightning struck. Lightning caused the initial damage and strong thunderstorm winds compounded the damage.

Additional information is presented in the following tables:

More detailed information concerning lightning data can be obtained from the monthly Storm Data publications. The National Climatic Data Center has lightning data available on magnetic tape for the period 1959-1985. The tape contains the date/time (year, month, day and hour), location (state and county), number of fatalities, number of injuries and amount of damage. A copy of this tape can be obtained by contacting the National Climatic Data Center, Federal Building, Asheville, North Carolina 28801-2696.

## LIGHTNING FATALITIES, 1985

STATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
ALABAMA	0	0	0	0	0	1	0	0	0	0	0	0	1
ALASKA	0	0	0	0	0	0	0	0	0	0	0	0	0
ARIZONA	0	0	0	0	0	0	0	0	1	0	0	0	1
ARKANSAS	0	0	0	0	0	1	0	0	0	0	0	0	1
CALIFORNIA	0	0	0	0	0	0	3	0	0	0	0	0	3
COLORADO	0	0	0	0	1	0	0	0	0	0	0	0	1
CONNECTICUT	0	0	0	0	0	0	0	0	0	0	0	0	0
DELAWARE	0	0	0	0	0	0	0	0	0	0	0	0	0
DISTRICT OF COLUMBIA	0	0	0	0	0	0	0	0	0	0	0	0	0
FLORIDA	0	0	0	0	0	0	3	0	0	1	0	0	4
GEORGIA	0	0	0	0	0	0	0	0	0	0	0	0	0
HAWAII	0	0	0	0	0	0	0	0	0	0	0	0	0
IDAHO	0	0	0	0	0	0	0	0	0	0	0	0	0
ILLINOIS	0	0	0	0	0	0	0	0	3	0	0	0	3
INDIANA	0	0	0	0	0	0	0	0	0	0	0	0	0
IOWA	0	0	0	0	1	3	0	0	0	0	0	0	4
KANSAS	0	0	0	1	1	0	0	1	0	0	0	0	3
KENTUCKY	0	0	0	1	1	2	0	0	0	0	0	0	4
LOUISIANA	0	0	0	0	0	0	1	1	0	0	0	0	2
MAINE	0	0	0	0	0	0	0	0	0	0	0	0	0
MARYLAND	0	0	0	0	0	0	1	1	0	0	0	0	2
MASSACHUSETTS	0	0	0	0	0	1	0	0	0	0	0	0	1
MICHIGAN	0	0	0	0	0	0	4	0	0	0	0	0	4
MINNESOTA	0	0	0	1	1	0	1	0	2	0	0	0	5
MISSISSIPPI	0	0	0	0	0	0	0	1	0	0	0	0	1
MISSOURI	0	0	0	0	1	0	2	0	0	0	0	0	3
MONTANA	0	0	0	0	0	0	0	0	0	0	0	0	0
NEBRASKA	0	0	0	0	0	0	0	0	0	0	0	0	0
NEVADA	0	0	0	0	0	0	0	0	0	0	0	0	0
NEW HAMPSHIRE	0	0	0	0	0	0	0	0	0	0	0	0	0
NEW JERSEY	0	0	0	0	1	0	2	0	0	0	0	0	3
NEW MEXICO	0	0	0	0	0	0	0	0	0	0	0	0	0
NEW YORK	0	0	0	0	1	0	1	1	0	0	0	0	3
NORTH CAROLINA	0	0	0	1	0	0	0	0	0	0	0	0	1
NORTH DAKOTA	0	0	0	0	0	0	0	0	0	0	0	0	0
OHIO	0	0	0	0	1	0	1	1	0	0	0	0	3
OKLAHOMA	0	0	0	0	0	0	0	0	0	0	1	0	1
OREGON	0	0	0	0	0	0	0	0	0	0	0	0	0
PENNSYLVANIA	0	0	0	0	0	0	0	0	0	0	0	0	0
PUERTO RICO	0	0	0	0	0	0	1	0	0	0	0	0	1
RHODE ISLAND	0	0	0	0	0	1	0	0	0	0	0	0	1
SOUTH CAROLINA	0	0	0	0	0	0	0	0	1	0	0	0	1
SOUTH DAKOTA	0	0	0	0	0	0	0	0	0	0	0	0	0
TENNESSEE	0	0	0	0	0	1	2	0	0	0	0	0	3
TEXAS	0	0	0	1	1	0	2	0	0	0	0	0	4
UTAH	0	0	0	0	0	0	2	0	0	0	0	0	2
VERMONT	0	0	0	0	0	0	0	0	0	0	0	0	0
VIRGINIA	0	0	0	0	0	2	0	1	1	0	0	0	4
WASHINGTON	0	0	0	0	0	0	0	0	0	0	0	0	0
WEST VIRGINIA	0	0	0	0	0	0	0	0	0	0	0	0	0
WISCONSIN	0	0	0	0	2	0	0	1	0	0	0	0	3
WYOMING	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	5	12	17	26	8	8	1	1	0	73

## LIGHTNING INJURIES, 1985

STATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
ALABAMA	0	0	0	0	1	0	1	1	0	0	0	0	3
ALASKA	0	0	0	0	0	0	0	0	0	0	0	0	0
ARIZONA	0	0	0	0	0	0	0	0	0	0	0	0	0
ARKANSAS	0	0	0	1	0	0	0	0	0	0	0	0	1
CALIFORNIA	0	0	0	0	0	0	3	0	0	0	0	0	3
COLORADO	0	0	0	0	2	0	1	0	0	0	0	0	3
CONNECTICUT	0	0	0	0	0	0	1	0	0	0	0	0	1
DELAWARE	0	0	0	0	0	0	0	0	0	0	0	0	0
DISTRICT OF COLUMBIA	0	0	0	0	0	0	0	0	0	0	0	0	0
FLORIDA	0	0	0	0	1	1	1	4	7	0	0	0	14
GEORGIA	0	0	0	0	0	3	1	0	0	0	0	0	4
HAWAII	0	0	0	0	0	0	0	0	0	0	0	0	0
IDAHO	0	0	0	0	0	0	0	0	0	0	0	0	0
ILLINOIS	0	0	0	0	0	0	0	0	8	0	0	0	8
INDIANA	0	0	0	0	0	0	0	1	0	0	0	0	1
IOWA	0	0	0	0	1	1	0	1	0	0	0	0	3
KANSAS	0	0	0	0	1	0	0	0	1	0	0	0	2
KENTUCKY	0	0	0	0	0	1	0	0	0	0	0	0	1
LOUISIANA	0	0	0	0	0	0	1	2	1	1	0	0	5
MAINE	0	0	0	0	0	0	4	4	0	0	0	0	8
MARYLAND	0	0	0	0	0	0	2	0	1	0	0	0	3
MASSACHUSETTS	0	0	0	0	0	4	0	0	0	0	0	0	4
MICHIGAN	0	0	0	0	1	1	10	1	0	0	0	0	13
MINNESOTA	0	0	0	0	6	0	0	0	0	1	0	0	7
MISSISSIPPI	0	0	0	1	0	0	1	1	2	0	0	0	5
MISSOURI	0	0	0	0	5	0	0	0	0	0	0	0	5
MONTANA	0	0	0	0	0	0	0	0	0	0	0	0	0
NEBRASKA	0	0	0	0	0	0	0	0	0	0	0	0	0
NEVADA	0	0	0	0	0	0	0	0	0	0	0	0	0
NEW HAMPSHIRE	0	0	0	0	0	0	0	1	0	0	0	0	1
NEW JERSEY	0	0	0	0	0	0	4	0	0	0	0	0	4
NEW MEXICO	0	0	0	0	0	0	1	2	0	0	0	0	3
NEW YORK	0	0	0	0	0	0	1	5	0	0	0	0	6
NORTH CAROLINA	0	0	0	1	0	3	2	1	1	0	0	0	8
NORTH DAKOTA	0	0	0	0	0	0	0	1	0	0	0	0	1
OHIO	0	0	29	0	20	0	4	1	0	0	0	0	54
OKLAHOMA	0	0	0	0	1	0	2	0	0	0	0	0	3
OREGON	0	0	0	0	0	0	0	0	0	0	0	0	0
PENNSYLVANIA	0	0	0	0	0	31	1	1	0	0	0	0	33
PUERTO RICO	0	0	0	0	0	0	1	0	0	0	0	0	1
RHODE ISLAND	0	0	0	0	0	0	0	0	1	0	0	0	1
SOUTH CAROLINA	0	0	0	0	0	1	1	1	0	1	0	0	4
SOUTH DAKOTA	0	0	0	0	1	0	2	0	0	0	0	0	3
TENNESSEE	0	0	0	0	0	1	8	0	0	0	0	0	9
TEXAS	0	0	0	1	2	0	4	1	0	0	0	0	8
UTAH	0	0	0	0	0	0	4	0	0	0	0	0	4
VERMONT	0	0	0	0	0	0	0	0	0	0	0	0	0
VIRGINIA	0	0	0	0	0	1	0	0	5	0	0	0	6
WASHINGTON	0	0	0	0	0	0	0	0	0	1	0	0	1
WEST VIRGINIA	0	0	0	0	0	0	0	0	0	0	0	0	0
WISCONSIN	0	0	0	0	0	0	0	4	0	0	0	0	4
WYOMING	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	29	4	42	48	61	33	27	4	0	0	248

## TOTAL DEATHS BY STATE FOR PERIOD 1959-1985

STATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
ALABAMA	0	0	2	2	4	17	24	14	1	1	0	0	65
ALASKA	0	0	0	0	0	0	0	0	0	0	0	0	0
ARIZONA	0	0	0	0	2	1	16	13	10	0	0	0	42
ARKANSAS	0	0	8	0	11	29	27	19	3	0	0	0	97
CALIFORNIA	0	0	0	0	0	2	6	5	3	0	0	0	16
COLORADO	0	0	0	1	10	14	29	15	0	1	0	0	70
CONNECTICUT	0	0	0	0	0	3	5	3	1	0	0	0	12
DELAWARE	0	0	0	0	2	2	3	3	0	0	0	0	10
DISTRICT OF COLUMBIA	0	0	0	0	0	1	1	1	0	0	0	0	3
FLORIDA	0	0	4	3	20	62	71	62	32	3	1	1	259
GEORGIA	0	0	2	3	4	15	25	10	2	1	0	0	62
HAWAII	0	0	0	0	0	0	0	0	0	0	0	0	0
IDAHO	0	0	0	1	1	6	5	5	1	0	0	0	19
ILLINOIS	0	0	0	4	7	21	12	11	10	2	0	0	67
INDIANA	0	0	1	2	6	21	15	12	5	2	0	0	64
IOWA	0	0	1	3	10	17	6	13	4	4	0	0	58
KANSAS	0	0	0	4	9	5	13	8	4	1	2	0	46
KENTUCKY	1	0	0	3	8	18	15	9	10	0	0	0	64
LOUISIANA	0	0	1	5	8	19	38	14	11	0	2	1	99
MAINE	0	0	0	0	0	3	5	6	0	3	0	0	17
MARYLAND	0	0	0	0	2	5	7	7	1	0	0	81	103
MASSACHUSETTS	0	0	0	1	3	4	5	7	1	0	0	0	21
MICHIGAN	0	0	0	1	6	19	24	21	5	0	0	0	76
MINNESOTA	0	0	0	3	3	8	7	12	10	1	0	0	44
MISSISSIPPI	1	0	4	2	11	9	23	18	5	0	0	0	73
MISSOURI	0	0	5	4	20	18	12	8	3	1	0	0	71
MONTANA	0	0	0	0	2	8	6	2	0	0	0	0	18
NEBRASKA	0	0	0	1	3	13	8	6	4	0	0	0	35
NEVADA	0	0	0	0	0	1	0	2	0	0	0	0	3
NEW HAMPSHIRE	0	0	0	0	0	3	2	0	0	0	0	0	5
NEW JERSEY	0	0	0	1	3	7	19	14	5	0	0	0	49
NEW MEXICO	0	0	0	1	3	6	21	26	4	0	0	0	63
NEW YORK	0	0	0	0	6	18	52	26	4	2	0	0	108
NORTH CAROLINA	0	1	4	3	20	29	45	32	4	0	0	0	138
NORTH DAKOTA	0	0	0	0	0	4	3	3	0	0	0	0	10
OHIO	0	0	0	3	8	21	39	15	8	2	2	0	98
OKLAHOMA	1	1	1	9	12	11	7	15	11	3	2	0	73
OREGON	0	0	0	0	1	0	0	1	2	1	0	0	5
PENNSYLVANIA	0	1	0	0	7	24	26	25	8	1	0	0	92
PUERTO RICO	0	0	0	0	0	3	6	8	5	3	0	0	25
RHODE ISLAND	0	0	0	0	0	1	1	0	2	0	0	0	4
SOUTH CAROLINA	0	0	1	0	5	9	29	11	7	0	0	0	62
SOUTH DAKOTA	0	0	0	0	4	1	4	1	3	3	0	0	16
TENNESSEE	0	1	1	6	12	31	18	17	13	2	3	0	104
TEXAS	0	0	0	14	25	14	38	21	14	7	1	0	134
UTAH	0	0	0	0	1	5	5	6	2	0	0	0	19
VERMONT	0	0	0	0	0	4	5	4	0	0	0	0	13
VIRGINIA	0	0	0	0	9	8	8	9	3	0	0	0	37
WASHINGTON	0	0	0	0	0	1	0	0	0	0	0	0	1
WEST VIRGINIA	0	0	0	0	4	2	8	2	1	0	0	0	17
WISCONSIN	0	0	0	1	2	8	12	11	2	1	1	1	39
WYOMING	0	0	0	0	2	4	7	6	2	0	0	0	21
TOTAL	3	4	35	81	276	557	763	559	226	45	14	84	2647

ON DECEMBER 8, 1963, THE CRASH OF A JETLINER KILLING 81 PEOPLE NEAR ELKTON, MARYLAND, WAS ATTRIBUTED TO LIGHTNING BY THE CIVIL AERONAUTICS BOARD INVESTIGATORS.

## TOTAL INJURIES BY STATE FOR PERIOD 1959-1985

STATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
ALABAMA	6	1	10	2	4	14	54	38	1	4	0	0	134
ALASKA	0	0	0	0	0	0	0	0	0	0	0	0	0
ARIZONA	2	0	0	0	6	1	27	21	14	0	0	0	71
ARKANSAS	1	2	2	10	26	15	30	57	9	1	0	1	154
CALIFORNIA	1	0	0	4	0	0	9	7	1	0	1	1	24
COLORADO	0	0	0	0	23	39	44	43	5	0	0	0	154
CONNECTICUT	0	0	2	0	3	17	13	11	6	0	0	0	52
DELAWARE	0	0	0	0	8	9	0	1	2	0	0	0	20
DISTRICT OF COLUMBIA	0	0	0	0	0	4	1	1	0	0	1	0	7
FLORIDA	0	1	13	12	27	161	167	163	127	27	0	1	699
GEORGIA	0	0	3	2	18	43	102	31	3	5	0	0	207
HAWAII	0	0	0	0	0	0	0	0	0	0	0	0	0
IDAHO	0	0	0	1	6	17	14	17	4	1	0	0	60
ILLINOIS	0	0	0	2	13	37	23	32	28	1	0	0	136
INDIANA	0	0	2	4	19	31	26	22	1	0	0	0	105
IOWA	0	0	1	7	22	41	35	18	16	3	1	0	144
KANSAS	0	0	5	10	14	23	37	24	27	4	1	0	145
KENTUCKY	0	0	0	2	19	55	47	17	10	1	0	0	151
LOUISIANA	1	0	6	2	13	13	95	38	14	1	1	1	185
MAINE	0	0	0	0	3	5	22	50	0	0	1	0	81
MARYLAND	0	0	0	0	21	16	33	17	6	0	0	0	93
MASSACHUSETTS	0	0	1	11	16	35	103	72	26	4	2	1	271
MICHIGAN	0	0	1	9	34	127	97	187	19	6	0	0	480
MINNESOTA	0	0	0	0	14	17	15	18	7	4	0	0	75
MISSISSIPPI	1	2	4	3	10	10	99	32	8	2	2	1	174
MISSOURI	0	1	1	8	20	16	4	15	3	2	4	0	74
MONTANA	0	0	0	0	5	9	10	8	0	0	0	0	32
NEBRASKA	0	0	0	4	14	6	8	12	5	0	0	0	49
NEVADA	0	0	0	0	0	0	0	2	0	0	0	0	2
NEW HAMPSHIRE	0	0	0	0	2	17	27	3	2	0	0	0	51
NEW JERSEY	0	0	0	0	3	11	53	18	16	0	0	0	101
NEW MEXICO	0	0	0	1	17	9	33	23	6	0	0	0	89
NEW YORK	0	0	0	1	4	49	87	124	23	3	1	0	292
NORTH CAROLINA	0	2	27	13	38	62	94	102	18	2	1	0	359
NORTH DAKOTA	0	0	0	0	2	0	0	5	4	0	0	0	11
OHIO	0	0	32	3	49	47	46	90	42	4	11	0	324
OKLAHOMA	1	1	3	14	28	36	32	32	19	19	5	2	192
OREGON	0	0	0	0	2	2	0	9	3	0	0	0	16
PENNSYLVANIA	0	5	0	0	9	105	78	134	41	2	0	0	374
PUERTO RICO	0	0	0	0	0	0	2	0	2	1	0	0	5
RHODE ISLAND	0	2	0	0	1	5	5	11	3	0	1	0	28
SOUTH CAROLINA	0	0	0	3	19	8	90	26	19	1	0	0	166
SOUTH DAKOTA	0	0	0	1	4	18	10	6	1	2	0	0	42
TENNESSEE	0	1	4	2	28	50	83	46	19	4	0	0	237
TEXAS	0	2	5	32	43	38	37	35	23	10	2	0	227
UTAH	0	0	0	0	2	18	12	14	4	0	0	0	50
VERMONT	0	0	0	0	0	3	10	2	0	0	0	0	15
VIRGINIA	0	0	0	2	7	13	39	24	6	0	0	0	91
WASHINGTON	0	0	0	0	4	1	7	7	0	1	0	0	20
WEST VIRGINIA	0	0	0	0	0	2	22	25	1	1	0	0	51
WISCONSIN	0	1	2	2	5	26	51	22	7	2	2	0	120
WYOMING	0	0	0	0	4	32	17	21	6	0	0	0	80
TOTAL	13	21	124	167	629	1313	1950	1733	607	118	37	8	6720

## TOTAL DEATHS BY YEAR FOR PERIOD 1959-1985

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1959	1	0	1	4	18	25	50	39	13	7	0	0	158
1960	0	0	1	5	7	33	25	17	9	0	0	0	97
1961	0	0	1	2	9	23	47	20	10	1	0	0	113
1962	0	0	3	6	27	20	26	28	9	1	0	0	120
1963	0	0	4	3	11	37	42	20	10	2	0	81	210
1964	0	0	9	6	15	21	29	19	7	1	1	0	108
1965	0	0	2	4	12	34	39	28	4	2	0	0	125
1966	0	0	1	1	8	15	21	16	11	3	0	0	76
1967	1	0	1	2	3	26	21	14	1	2	1	1	73
1968	0	0	0	1	5	24	30	29	9	3	1	1	103
1969	0	0	1	5	13	17	27	13	14	3	0	0	93
1970	0	0	0	1	17	25	27	19	21	1	0	0	111
1971	0	0	2	1	12	27	33	19	19	0	0	0	113
1972	0	0	1	1	5	21	31	28	3	1	0	0	91
1973	0	1	2	3	10	24	31	16	13	2	1	0	105
1974	0	2	0	7	12	21	28	24	6	0	2	0	102
1975	0	1	3	3	11	19	28	18	6	2	0	0	91
1976	0	0	0	1	9	19	19	19	3	2	0	0	72
1977	0	0	0	4	9	19	16	35	14	1	0	0	98
1978	0	0	1	1	9	26	24	22	3	1	0	1	88
1979	0	0	0	3	11	4	20	16	4	3	2	0	63
1980	0	0	0	0	7	16	27	20	5	1	0	0	76
1981	0	0	0	4	5	13	19	19	5	0	2	0	67
1982	1	0	0	3	5	14	29	18	4	3	0	0	77
1983	0	0	1	2	4	8	28	23	8	1	2	0	77
1984	0	0	1	3	10	14	20	10	7	1	1	0	67
1985	0	0	0	5	12	12	26	8	8	1	1	0	73
TOTAL	3	4	35	81	276	557	763	559	226	45	14	84	2647
AVERAGE	0	0	1	3	10	21	28	21	8	2	1	3	98

ON DECEMBER 8, 1963, THE CRASH OF A JETLINER KILLING 81 PEOPLE NEAR ELKTON, MARYLAND, WAS ATTRIBUTED TO LIGHTNING BY THE CIVIL AERONAUTICS BOARD INVESTIGATORS.

## TOTAL INJURIES BY YEAR FOR PERIOD 1959-1985

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1959	0	0	0	5	27	52	110	103	23	3	1	1	325
1960	0	0	2	11	12	70	28	50	16	9	4	0	202
1961	0	0	7	14	15	49	83	50	31	5	1	1	256
1962	0	0	3	5	39	38	90	49	12	6	0	0	242
1963	7	0	0	6	14	64	55	44	18	1	0	0	209
1964	0	0	10	15	14	38	99	53	8	1	1	0	239
1965	3	2	2	4	26	42	59	59	19	1	0	0	217
1966	0	2	1	2	37	39	42	44	15	1	0	0	183
1967	0	0	0	4	7	35	59	33	4	2	0	1	145
1968	0	0	4	2	16	52	117	155	14	9	1	0	370
1969	0	0	0	4	19	75	39	23	12	0	0	1	173
1970	0	0	1	5	40	40	82	43	43	4	1	0	259
1971	0	1	0	1	24	71	79	54	22	1	1	0	254
1972	0	0	8	6	12	24	72	54	24	2	1	0	203
1973	0	0	10	2	20	23	74	59	29	9	2	0	228
1974	1	9	1	3	12	27	56	51	12	1	0	0	173
1975	0	3	0	1	30	60	107	154	42	1	0	1	399
1976	0	1	0	7	16	39	73	68	13	1	0	1	219
1977	0	0	0	3	35	58	58	67	62	4	4	0	291
1978	0	0	5	3	19	100	73	54	42	5	0	0	301
1979	0	2	4	26	32	73	55	49	9	2	2	0	254
1980	0	1	2	11	11	49	50	134	16	1	0	0	275
1981	1	0	2	9	34	60	108	52	9	3	13	0	291
1982	1	0	2	6	38	20	54	32	11	4	4	2	174
1983	0	0	24	3	25	24	87	113	30	31	0	0	337
1984	0	0	7	5	13	43	80	53	44	7	1	0	253
1985	0	0	29	4	42	48	61	33	27	4	0	0	248
TOTAL	13	21	124	167	629	1313	1950	1733	607	118	37	8	6720
AVERAGE	0	1	5	6	23	49	72	64	22	4	1	0	249

# NORTH ATLANTIC TROPICAL CYCLONES, 1985

Robert A. Case  
and  
Harold P. Gerrish  
National Hurricane Center, NOAA  
Miami, Florida

Hurricane activity in the Atlantic basin remained nearly normal for the second year in a row. The 1985 season produced 11 tropical cyclones, 7 of which reached hurricane strength. The long term average is ten, six of which attain hurricane strength. This year six hurricanes and two tropical storms struck the coastline of the United States making this the most active season for strikes on the U.S. coast since 1916. Table 1 gives a summary of this year's activity and tables 2 and 3 summarize data since 1930. Table 4 lists ships encountering winds of 50 kn or more.

Figure 1 shows the tropical cyclone tracks for 1985. A total of four hurricanes occurred in the Gulf of Mexico this season. Also tropical storm Bob formed in the southeast gulf. The east coast of the United States was struck by two hurricanes and two tropical storms, while a third tropical storm formed off the Georgia coast and a fourth tropical storm exited off the Carolina coast.

This year was the fourth straight season that the Caribbean remained free from hurricane activity. Figure 2 shows the erratic tracks of hurricane Elena and Juan.

## TROPICAL STORM ANA, JULY 15-19

Tropical storm Ana formed in the Atlantic about 125 miles southwest of Bermuda on 16 July. Ana moved on a northerly course and the central pressure deepened to 996 mb as it passed across the shipping lanes of the northwest Atlantic toward Sable Island. On the morning of 18 July the S.S. SEALAND PRODUCER passed very close to the center of Ana. Figure 3 shows the barograph trace of the PRODUCER with a minimum central pressure of 996 mbs, which was within a millibar of the pressure reported by the reconnaissance aircraft later that morning.

Ana buffeted Sable Island with sustained winds of 60 kn as the storm passed within 50 mi of the island. On 19 July the PACIFIC PATRIOT, located to the west of the center

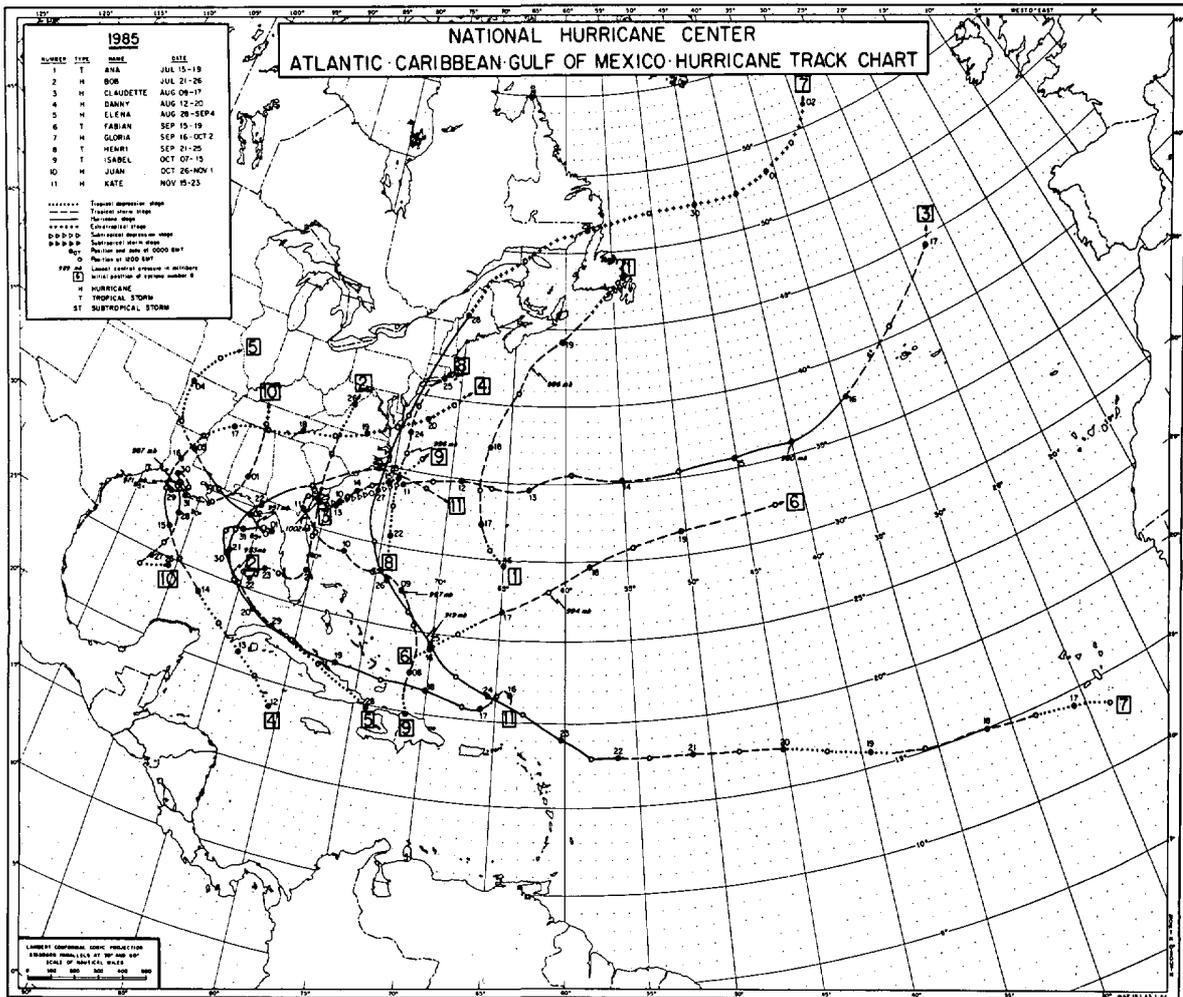


Figure 1.-- Tropical cyclone tracks, 1985.

Table 1.-- Summary of North Atlantic tropical cyclone statistics, 1985

Cyclone Number	Name	Class	Dates	Maximum Sustained Winds (kn)	Lowest Pressure (mb)	U.S. (\$ Damage) (millions)	Deaths
1	ANA	T	7/15-7/19	60	996		
2	BOB	H	7/21-7/26	65	1002		
3	CLAUDETTE	H	8/09-8/17	75	980		
4	DANNY	H	8/12-8/20	80	987	50	1
5	ELENA	H	8/28-9/04	110	951	1000	4
6	FABIAN	T	9/15-9/19	55	992		
7	GLORIA	H	9/16-10/02	125	919	900	8
8	HENRI	T	9/21-9/25	50	996		
9	ISABEL	T	10/07-10/15	60	997		
10	JUAN	H	10/26-11/01	75	971	1500	12
11	KATE	H	11/15-11/23	105	953	300	5

T: Tropical storm, wind speed 34 - 63 kn  
H: Hurricane, wind speed 64 kn or higher

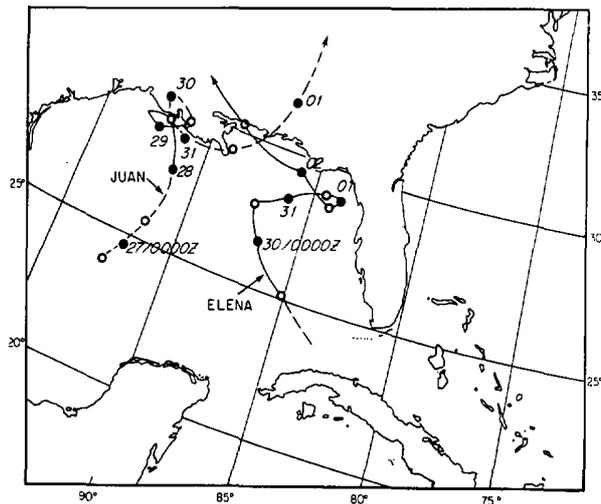


Figure 2.--Erratic tracks of Elena and Juan.

Table 2.-- Frequency of tropical cyclones by months and years.

	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	
1931		1	1	2	3	1	1		9	
1932		1		3	3	3	1		11	
1933		1	1	3	7	5	3	1	21	
1934		1	1	1	2	2	3	1	11	
1935				3	1	2			6	
1936			3	2	6	4	1		16	
1937				1	2	6			9	
1938					3	1	3	1	8	
1939			1		1	1	2		5	
1940		1			3	2	2		8	
1941					4	2			6	
1942					3	3	1		10	
1943				1	2	4	3		10	
1944				3	2	4	2		11	
1945			1	1	4	3	2		11	
1946			1	1	1	1	2		6	
1947				1	2	3	3		9	
1948		1		1	2	3	1		9	
1949					3	7	2		13	
1950					4	3	6		13	
1951		1			3	4	2		10	
1952	(Feb)			2	2	2	2		7	
1953		1			3	4	4		14	
1954			1	1	2	4	1	1	11	
1955				1	4	5	2		12	
1956			1	1	1	4	1		8	
1957				2	1	4	1		8	
1958			1	1	4	4	1		10	
1959		1		2	2	1	3	2	11	
1960			1		2	1	3		7	
1961				1		6	2	2	11	
1962					2	2	1		5	
1963				1	1	5	2		9	
1964			1	1	4	4	1	1	12	
1965			1		2	2	1		6	
1966			1	4	1	4		1	11	
1967				1	1	4	3		8	
1968			3		1	3	1		8	
1969				1	5	6	5	1	18	
1970		1		1	3	3	2		10	
1971				1	4	6	1	1	13	
1972		1	1		2	2	2	1	7	
1973				2	2	2	2		8	
1974			1	1	4	4	1		11	
1975			1	1	2	3	1		9	
1976		1		1	5	2	1		10	
1977				1	1	3	2		6	
1978	(Jan)			1	4	3	3		12	
1979			1	2	3	2	1		9	
1980				3	5	1	1	2	11	
1981		1	1		2	5	1	1	11	
1982			1		1	2	1		5	
1983				2	2	2			4	
1984				4	6	1	1	1	13	
1985				2	3	3	2	1	11	
Totals	(Jan) (Feb)	12	29	43	139	189	98	22	4	538

Table 3.-- Frequency of hurricanes by months and years.

	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1931					2				2
1932					3	1			4
1933			1	1	3	3	1	1	9
1934			1	1	1	1	1		6
1935					2	1	2		5
1936			1	1	3	2			7
1937					3				3
1938					2	1			3
1939					1		2		3
1940					3	1			4
1941					3		1		4
1942					3				4
1943				1	1	2	1	1	5
1944				2	1	3	1		7
1945			1		1	1	2		5
1946				1	1	1	1		4
1947					2	1	2		5
1948					1	3	1	1	6
1949					2	4	1		7
1950					4	3	4		11
1951	1				2	3	2		8
1952					2	2	2		6
1953					2	3	1		6
1954			1		2	3	1		8
1955					3	5	1	1	9
1956				1	1	1	1		4
1957			1		1	2			3
1958					3	3	1		7
1959			1	2	3	3	1		7
1960				1	1	2			4
1961				1		5	1	1	8
1962					1	1	1		3
1963				1	1	4	1		7
1964					2	3	1		6
1965					2	1	1		4
1966			1	3	1	1		1	7
1967					1	3			4
1968			2		1	1	1		5
1969					4	4	3	1	12
1970		1			1	1	2		5
1971					2	4			6
1972			1		1	1			3
1973				1	1	1	1		4
1974					2	2			4
1975				1	2	3			6
1976					4	1	1		6
1977					1	3	1		5
1978					2	2	1		5
1979				1	2	2			5
1980					3	3	1	2	9
1981					1	5		1	7
1982			1		1				2
1983					2	1			3
1984					2	1	1	1	5
1985				1	3	1	1		7
Totals	2	12	20	89	119	51	12	2	307

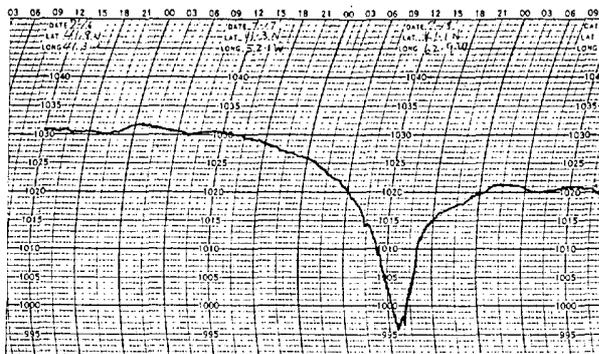


Figure 3.-- Barograph trace from the SEA-LAND PRODUCER as she passed close to Ana.

near 43.5°N, 62.4°W reported winds of 010° at 60 kn with a pressure of 1009.8 mb. Ana became extratropical and merged with a frontal trough over Newfoundland later in the day on 19 July.

Table 4.-- Ships encountering tropical cyclone winds of 50 kn or more in 1985.

TROPICAL CYCLONE	VESSEL CALL SIGN	DATE MO DAY	TIME GMT	SHIP POSITION		WIND DIR. SPEED		PRESSURE (MB)
				LAT. N	LONG. W	DEG	(kn)	
ANA	GCPZ	07 19	0000	43.5	62.4	010	60	1009.8
	FUZZ	07 19	1800	46.0	49.7	210	50	1003.0
BOB	(NONE)							
CLAUDETTE	(NONE)							
ELENA	KPGL	08 29	1800	25.6	85.1	260	55	1006.0
	ELKF	08 31	0300	28.1	85.1	200	55	989.0
	NQST	09 01	1200	25.3	86.1	280	50	1014.0
FABIAN	(NONE)							
GLORIA	HZST	09 22	0000	21.0	54.0	130	55	1014.0
	KMMF	09 25	0600	27.0	68.2	130	50	1009.2
	KMMF	09 25	0900	27.0	68.0	140	55	1010.0
	KLHC	09 27	1200	37.7	69.4	180	50	1000.9
	SHIP	09 27	1200	38.6	74.8	330	65	985.9
HENRI	(NONE)							
ISABEL	PJSU	10 07	1800	21.0	69.5	160	50	1006.5
	KCLZ	10 09	2100	30.1	80.6	030	50	1020.3
JUAN	????	10 29	0000	27.5	91.0	210	55	986.1
	SHIP	10 31	1800	26.8	85.5	260	55	998.5
KATE	ELBM	11 17	0000	20.5	66.8	350	50	1004.0
	UFBR	11 17	0600	22.7	66.5	080	50	1006.8
	UFBR	11 17	1200	22.6	67.8	010	70	1007.1
	VSBN	11 21	0000	25.6	87.8	340	60	1005.5
	SHIP	11 22	1800	32.8	77.9	170	50	1005.0

#### HURRICANE BOB, JULY 21-26

Bob became a tropical storm in the Gulf of Mexico southwest of Fort Myers, Florida on 22 July. The system crossed the southern Florida peninsula and turned toward the north. Bob had little effect, other than beach erosion, on the eastern Florida and Georgia coast as it moved northward. Minimal hurricane force winds were detected by reconnaissance aircraft prior to Bob's landfall on the South Carolina coast (fig. 4). Therefore, the storm was upgraded to a hurricane before its center passed over the coast near Beaufort, South Carolina at 0300, 25 July.

No ships in the vicinity of Bob reported winds of 50 kn or greater. Maximum winds at landfall occurred in rainbands along the coast. The Coast Guard station at Georgetown, South Carolina had sustained winds of 50 kn while Holden Beach, North Carolina had a peak gust of 72 kn.

#### HURRICANE CLAUDETTE, AUGUST 9-17

Claudette began as a non-tropical low pressure center just off the Georgia coast on

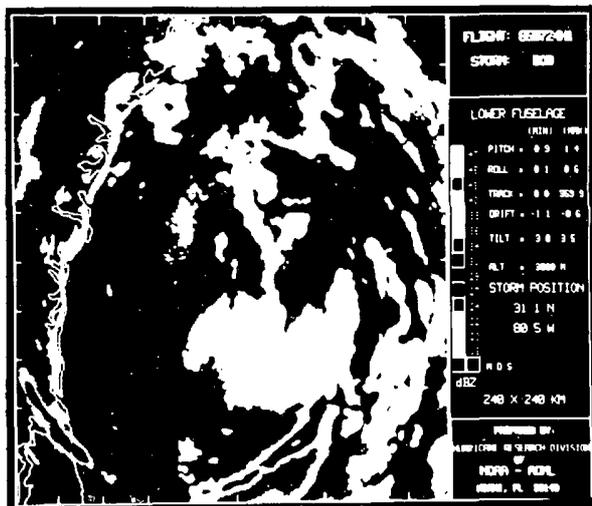


Figure 4.--Lower-fuselage radar image from NOAA P-3 aircraft of Bob, 1800, July 24. Mike Black ERL/AOML prepared this image. Courtesy of Peter Dodge, ERL/AOML.

9 August. The system moved on a northeast track and began to develop tropical characteristics as it moved over the warm waters of the Gulf Stream. It became tropical storm Claudette on 11 August while located about 120 mi southeast of Cape Hatteras, North Carolina. Claudette turned eastward and passed 150 mi north of Bermuda. Enroute to the Azores, Claudette attained hurricane strength from 14 to 16 July (980mb) and later as a tropical storm passed directly over Corvo, an island community in the Azores.

#### HURRICANE DANNY, AUGUST 12-20

Danny had its beginnings as an African wave which developed into a depression in the northwest Caribbean on 12 August. Danny reached storm strength in the southeast Gulf of Mexico at 0000, 14 August and became a hurricane on the afternoon of 14 August, when located about 200 mi off the Louisiana coast. The system continued to strengthen to a 987 mb hurricane as it moved onshore just southeast of Lake Charles, Louisiana at midday on 15 August (fig. 5). The hurricane quickly weakened to storm strength as it moved inland across Louisiana.

Maximum winds measured by reconnaissance

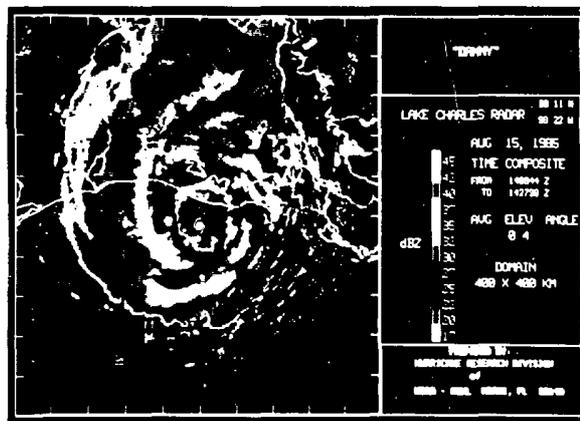


Figure 5.-- Lake Charles radar image of Danny 15 August. Courtesy Peter Dodge, ERL/AOML

aircraft near the coast at the time of landfall were near 80 kn. If there were any ships that experienced winds in excess of 50 kn, their reports failed to reach the Hurricane Center. Several oil rigs (anemometer heights and characteristics of the rigs vary from site to site) in the northwestern Gulf of Mexico had hurricane force winds. Strongest winds were reported by the rig EC42B, located at 29.5°N, 92.8°W, which had sustained winds of 80 kn and a peak gust of 100 kn.

#### HURRICANE ELENA, AUGUST 28 - SEPTEMBER 4

Elena was a well-organized cloud pattern as it moved across the tropical Atlantic at a forward speed of 30 kn. It finally developed into a depression just east of Cuba and was named on 28 August when the center was over central Cuba. The storm moved toward the northwest and strengthened to a hurricane on 29 August after it moved over the open waters of the southeastern Gulf of Mexico. A collapse of the steering currents caused a marked decrease in Elena's forward speed as it moved into the central Gulf on 30 August. A frontal trough, moving across the U.S. from west to east, turned Elena toward the east-northeast and spread its hurricane force winds over the northeastern Gulf. The frontal trough weakened and lost its effect on the hurricane and Elena made an anticyclonic loop off Cedar Key, Florida. High pressure began building over the eastern U.S. behind the trough and forced the hurricane to begin a gradual acceleration toward the west-northwest.

On the afternoon of 1 September, while the center of Elena was 75 mi south of Apalachicola, Florida, the hurricane reached its minimum central pressure of 951 mb (fig. 6). Thereafter, the hurricane weakened slowly to 959 mb as the center moved onshore near Biloxi, Mississippi on the morning of 2 September.

Maximum reported coastal winds were from Dauphin Island, Alabama where sustained winds of 91 kn with gusts to 117 kn were recorded.

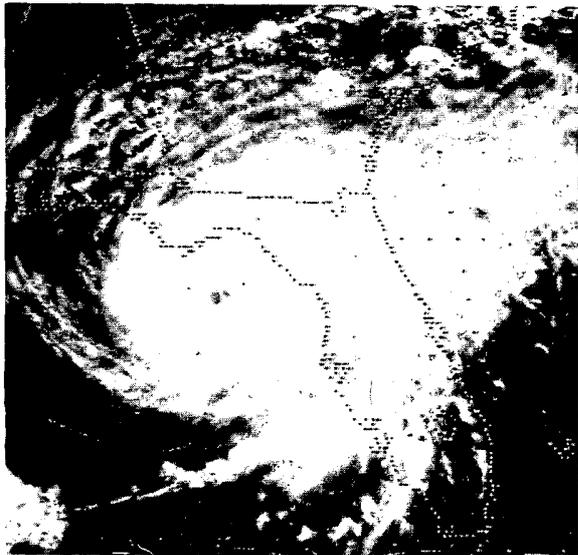


Figure 6.--Elena at 1631. September 1 south of the Florida panhandle. NOAA GOFS

Most ship activity managed to stay out of Elena's path. However, three ships observed sustained winds of 50 kn or stronger. The ADRIATIC SEA located near 28.1°N, 85.1°W at 0300, 31 August reported winds of 190° at 55 kn with gusts to 70 kn and a central pressure of 989.0 mb. These were the strongest winds observed by any vessel in the Gulf during Elena.

#### TROPICAL STORM FABIAN, SEPTEMBER 15-19

Fabian formed from an area of disturbed weather which combined with an old frontal system in the Atlantic several hundred miles north of the island of Hispaniola. On 15 September, the depression began to move along the front toward the northeast and attained storm strength by the afternoon of the 16th. The tropical storm reached its lowest pressure of 992 mb by the morning of 17 September. Fabian lost its identity in the circulation of a new, much larger, non-tropical low center by midday on 19 September. Several ships located near the new non-tropical low pressure center reported winds of 50 kn or stronger. The MARILOCK experienced winds of 70 kn or greater from 1800, 17 September through 1200, 18 September.

#### HURRICANE GLORIA, SEPTEMBER 16 - OCTOBER 2

Gloria had its start near the Cape Verde Islands on 16 September. Even though it was somewhat late in the season for Cape Verde storms, the system managed to maintain its westward track across the tropical Atlantic. By 22 September, hurricane Gloria approached the Leeward Islands. However, prior to reaching the islands, Gloria turned toward the northwest. On 23 and 24 September, as Gloria pursued a track parallel and just to the east of the Bahamas, the central pressure within the hurricane fell at a rate of 2 mb per hour to a minimal pressure of 919 mb (fig. 7). This was the lowest pressure observed in a hurricane since Allen (899mb) in 1980 and the lowest pressure measured in the southwest North Atlantic since aircraft reconnaissance began in the mid 1940s.

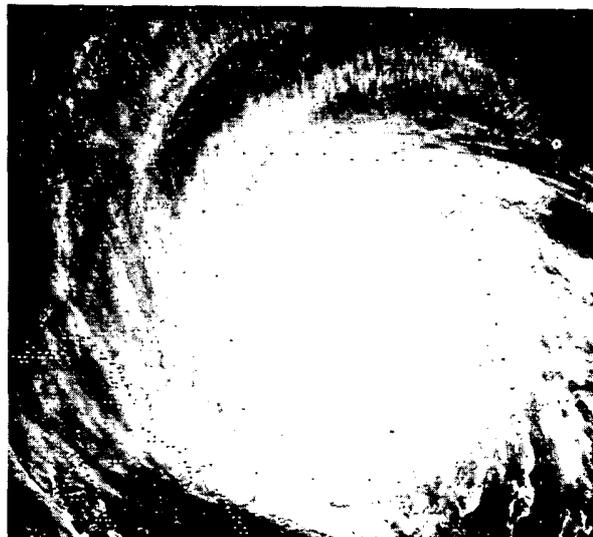


Figure 7.--Gloria 1401, September 25 east of the Bahamas. NOAA GOFS



Figure 8.--Waves from Gloria break along a pier at Atlantic Beach, NC. Wide World Photo

Gloria weakened to 942 mb as it brushed Cape Hatteras after midnight on 27 September (fig. 8). Ten hours later, Gloria's center crossed over western Long Island, New York with a landfall pressure of 961 mb. The hurricane became extratropical over New England later that evening. As an extratropical storm, Gloria emerged back over the open waters of the far North Atlantic (fig. 1).

As Gloria approached the east coast of the U.S., it passed within 60 mi of a NOAA data buoy. At 2000 on 26 September the Buoy 41002, located at 32.3°N, 75.3°W, measured sea heights of 14.3 meters (47 ft). These were the highest seas ever reported by a NOAA data buoy. Eight minute sustained wind speeds measured by the buoy during this time period were near 50 kn with peak gusts to 73 kn. At 0500, 27 September, Diamond Shoal Light reported maximum winds of 85 kn with a peak gust to 104 kn. During the life of the hurricane nearly a half dozen different ships reported winds of 50 kn or stronger.

#### TROPICAL STORM HENRI, SEPTEMBER 21-25

Henri began in a trough of low pressure to the north of Hispaniola. The area of disturbed weather began to drift north and by midday on 21 September an organized depression developed about 400 mi east of Jacksonville, Florida. Continuing its northerly drift, it reached tropical storm strength and its lowest pressure (996 mb) while located off Cape Hatteras near daybreak on 23 September. Adverse atmospheric conditions and cooler water temperatures caused Henri to gradually weaken to 1007 mb by the time it made landfall on the eastern tip of Long Island during the late afternoon of 24 September.

#### TROPICAL STORM ISABEL, OCTOBER 7-15

An area of disturbed weather on the northern edge of a westerly moving tropical wave became fragmented from the wave and developed into a weak low pressure area near Hispaniola. The low pressure area was classified as a tropical depression on 7 October as it began drifting toward the north. The ROTTERDAM located near 21.0°N, 69.5°W later in the day reported 50 kn winds

from 160° and the depression was upgraded to tropical storm Isabel. The storm became better organized with the minimum pressure dropping rather rapidly to a minimum of 997 mb by the evening of 8 October. However, a frontal trough approached from the northwest and strong southwesterly flow across the storm caused it to weaken and slow its northward movement. Strong high pressure behind the front then forced Isabel to take a west-northwest track toward the southeast U.S. coast.

While the storm was located well offshore on 9 October, the CHILBAR located near 30.1°N, 80.6°W at 2100, reported winds from 030° at 50 kn. Also a NOAA data buoy located at 29.3°N, 77.3°W reported sustained winds near gale force with gusts in excess of gales for a 3 hr period late on the 9th. Fortunately, Isabel had lost most of its deep convective activity by 1800 9 October and continued to weaken as it approached the coast. As a result, Isabel was downgraded to a depression near the time of landfall on the south Georgia coast. The weakened system lingered near the coast for 2 days before emerging over the Georgia/South Carolina coastal waters. Isabel moved northeastward and lost its identity as a strong frontal trough approached from the west.

#### HURRICANE JUAN, OCTOBER 26 - NOVEMBER 1

Juan formed in the central Gulf of Mexico in a broad trough of low pressure. Easterly winds approaching gale force and deteriorating weather developed over a broad area of the northern Gulf in response to the developing depression and a large high pressure system covering the eastern U.S. Juan became a tropical storm on 26 October and reached hurricane strength by the evening of 27 October as it made a cyclonic loop just off the central Louisiana coast for the following 24 hrs (fig. 9 and 10). The hurricane finally made landfall near Morgan City on the morning of 29 October. The following day, Juan made a second cyclonic loop around Lafayette, Louisiana before emerging over Vermilion Bay on 30 October. While inland, Juan was downgraded to a tropical storm. After skirting the Louisiana coast, Juan moved

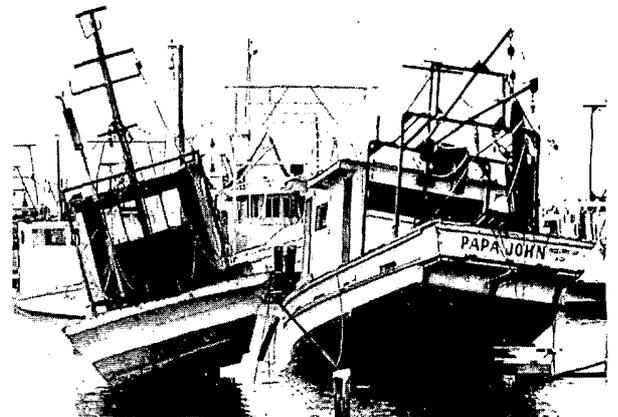


Figure 9.--Two shrimp boats stranded by receding tides of hurricane Juan. Wide World Photo.

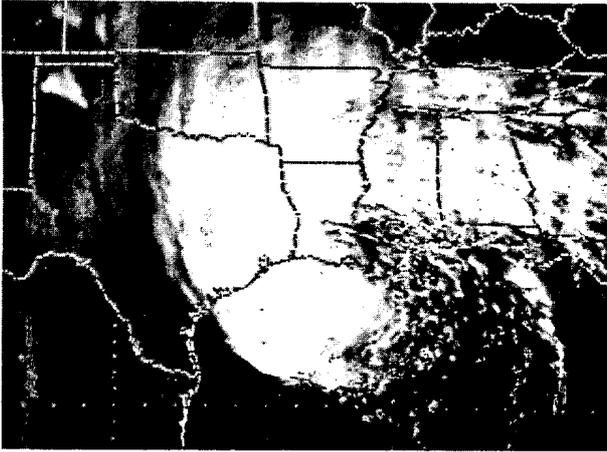


Figure 10.--Hurricane Juan at minimum pressure of 971 mb October 28. NOAA GOES



Figure 11.-- Hurricane Kate at her most intense stage, 2000, November 20. NOAA GOES

across the mouth of the Mississippi River and made landfall again just west of Pensacola, Florida at midday on the 31st.

The only surface reports of hurricane force winds were from the oil rigs in the open waters of the Gulf. Maximum sustained winds from the rigs were 80 kn with gusts to 95 kn. Only two ships reported winds in excess of 50 kn associated with Juan (see table 4).

Nine of the 12 reported deaths from Juan were caused by toppled oil rigs or boats lost while transporting oil workers. Two rigs were lost during the hurricane but fortunately, most of the crew of one toppled rig were rescued. High tides in excess of 2 meters along the Louisiana coast inundated many coastal communities and heavy rains of 10 to 15 in over parts of Louisiana caused extensive flooding. With a death total of 12 and a damage estimate of 1.5 billion, Juan was the deadliest and costliest hurricane of the season.



Figure 12.--This is what remained of two beach houses after hurricane Kate swept through the Florida panhandle. Wide World Photo.

#### HURRICANE KATE, NOVEMBER 15-23

Development of Kate began just northeast of the Virgin Islands when a weak tropical wave began to interact with an upper air trough on 13-14 November. There were no ship reports from the area and by the time (15 November) reconnaissance aircraft reached the system it had already attained tropical storm strength. Kate began moving in a general westerly direction and reached hurricane force by 1800 on the 16th. The HOLSTENDAMM, located near 20.5°N, 66.8°W at 0000, 17 November, was 50 mi to the west of the center of Kate when it reported winds of 360° at 50 kn. Hurricane Kate passed more than 100 mi to the south of the BORIS BUVIN on the 17th. However, the ship experienced maximum sustained winds of 70 kn at 1200 on the morning of 17 November.

Kate strengthened to a central pressure of 967 mb by the time it moved onto the north central Cuban coast on the 19th. It maintained hurricane strength while tracking just inland along the northern coast. After Kate emerged over the waters of the southeastern Gulf of Mexico it strengthened at a rate of nearly 1 mb per hour, reaching a minimum pressure of 953 mb by 2000 on 20 November (fig. 11). Three hours earlier a NOAA data buoy in the east central Gulf (42003), located at 26.0°N, 85.9°W, reported averaged winds of 94 kn with a peak gust of 118 kn and sea heights of 10.7 meters (35 ft).

Thereafter, Kate weakened slowly to 967 mb at landfall near Mexico Beach in the Florida Panhandle late in the day on 21 November (fig. 12). Gale warnings were required along the southeast U.S. coast on the 22nd as tropical storm Kate emerged into the Atlantic waters. The storm turned toward the east and continued to weaken. Wind gusts of 23 kn were experienced at Bermuda on the morning of 24 November as the remnants of Kate passed over the island.

## 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 heavy sleet storm
- # Freezing drizzle and freezing rain, commonly known as glaze
- ≠ Not received or incomplete
- o/c Under Estimated Damage, Property/Crops, indicates crop damage amount is included in the figure given

### Definition of Fujita Tornado Scale (F scale)

(F0) Gale tornado (40-72 mph): Light damage  
Some damage to chimneys; break branches off trees; push over shallow-rooted trees; damage sign boards.

(F1) Moderate tornado (73-112 mph): Moderate damage  
The lower limit (73 mph) is the beginning of hurricane wind speed; peel surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads.

(F2) Significant tornado (113-157 mph): Considerable damage  
Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light-object missiles generated.

(F3) Severe tornado (158-206 mph): Severe damage  
Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off ground and thrown.

(F4) Devastating tornado (207-260 mph): Devastating damage  
Well-constructed houses leveled; structure with weak foundation blown off some distance; cars thrown and large missiles generated.

(F5) Incredible tornado (261-318 mph): Incredible damage  
Strong frame houses lifted off foundations and carried considerable distance to disintegrate; automobile-sized missiles fly through the air in excess of 100 m; trees debarked; incredible phenomena will occur.

(F6-F12) (319 mph to Mach 1, the speed of sound):  
The maximum wind speeds of tornadoes are not expected to reach the F6 wind speeds.

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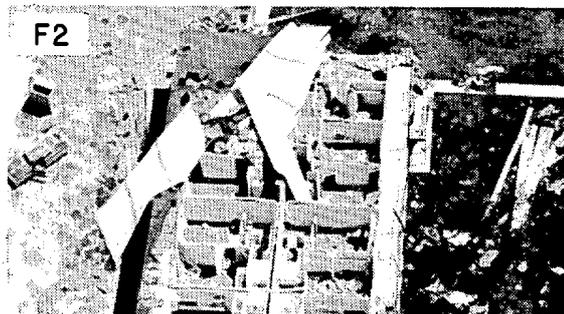
(F0+F1) Weak Tornado

(F2+F3) Strong Tornado

(F4+F5) Violent Tornado

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