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# STORM DATA



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**noaa**

NATIONAL OCEANIC AND  
ATMOSPHERIC ADMINISTRATION

NATIONAL ENVIRONMENTAL SATELLITE,  
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NATIONAL CLIMATIC DATA CENTER  
ASHEVILLE, N.C.

C O N T E N T S

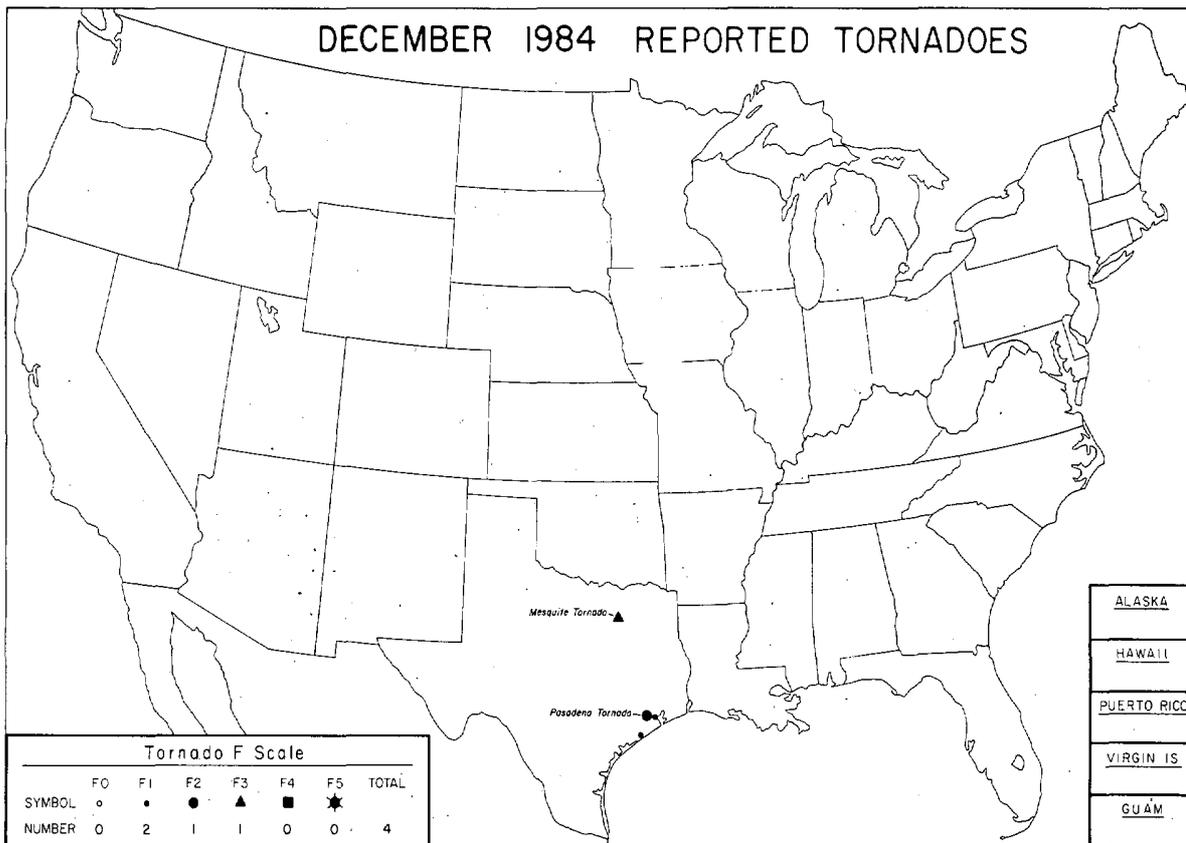
	<u>Page</u>
Outstanding Storms of the Month.....	3
Storm Data and Unusual Weather Phenomena.....	16
Storm Summary.....	24
Annual Summaries	
Tornadoes.....	25
Lightning.....	39
North Atlantic Tropical Cyclones.....	46
Reference Notes.....	53
"F" Scale Definitions.....	53

Cover: Tree limbs litter a street in Hutchinson, Kansas after breaking under the weight of a thick ice coating received during three days of freezing rain on December 13-15, 1984 (see page 8).  
---Photo by Larry Caldwell, The Hutchinson News; supplied by the NWSFO, Topeka, Kansas.

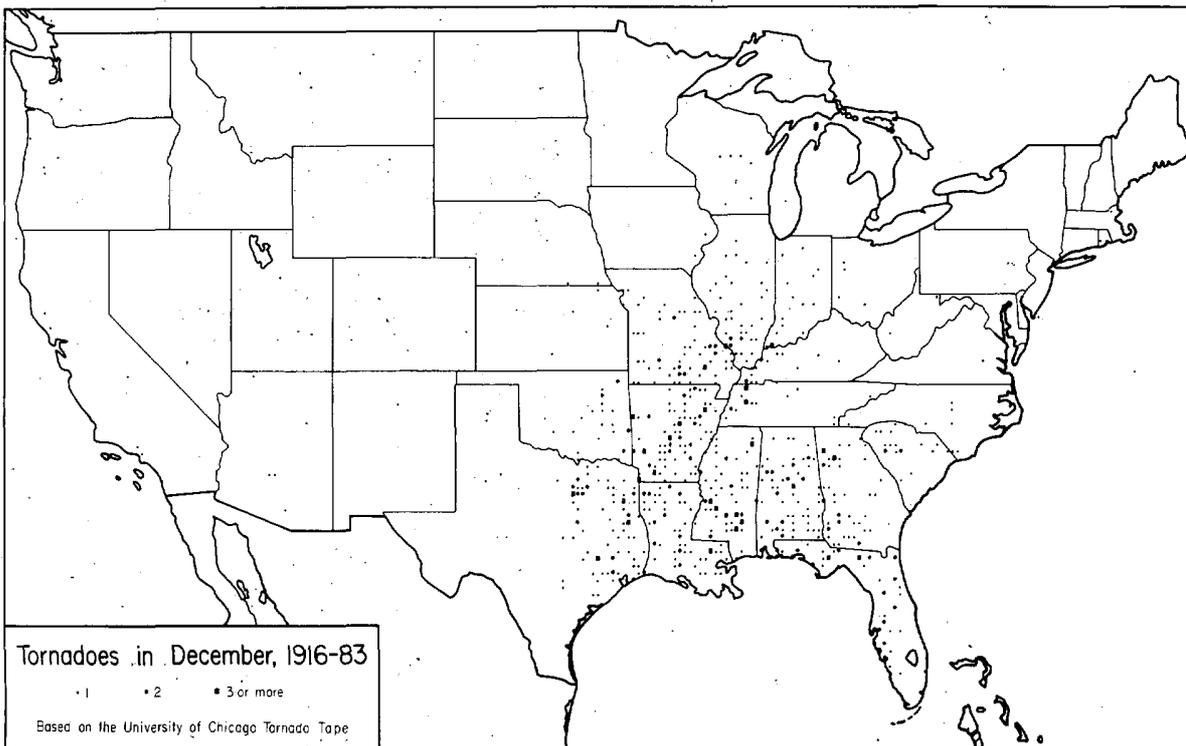
NOTE: The section on Outstanding Storms of the Month is prepared by Professor T. Theodore Fujita, editor, and Duane J. Stiegler, associate editor, University of Chicago. The narrative descriptions of Storms by State and Summaries of Hurricanes and Tropical Storms are prepared by the National Weather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

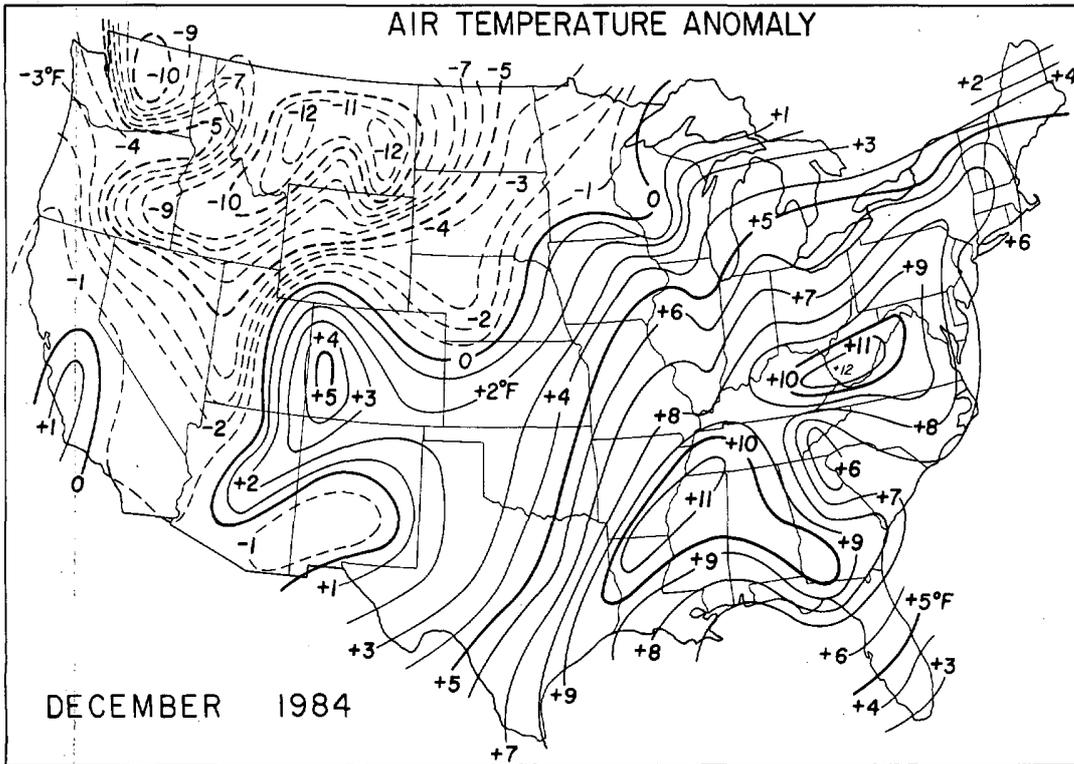
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# OUTSTANDING STORMS OF THE MONTH



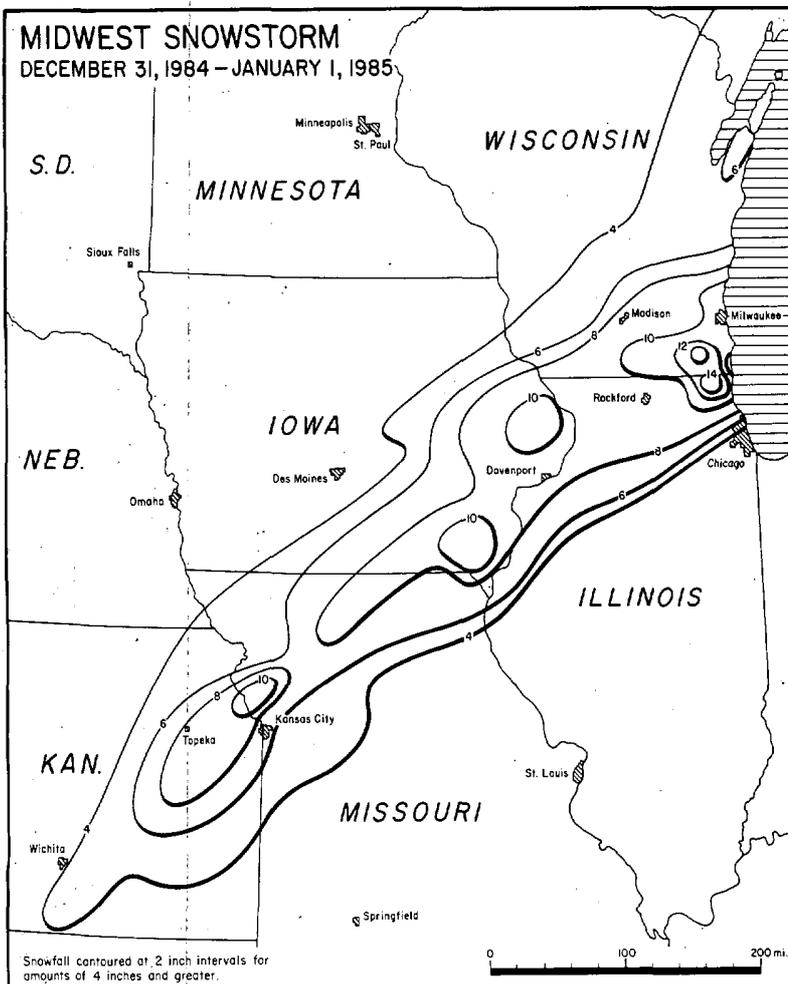
● COMPLETE REPORT RECEIVED	● 1AL	● 7DE	● 14KS	● 21MN	● 28NJ	● 33OH	● 39SD	● 44VA	● 49AK(SE)
○ PRELIMINARY REPORT RECEIVED	● 2AZ	● 8FL	● 15KY	● 22MS	● 29NM	● 34OK	● 40TN	● 45WA	● 50HI
○ REPORT NOT RECEIVED	● 3AR	● 9GA	● 16LA	● 23MO	● 30NY(O)	● 35OR	● 41TX(N)	● 46WV	● 51PR
(N) northern (W) western	● 4CA(N)	● 10ID	● 17ME	● 24MT	● 30NY(C)	● 36PA(E)	● 41TX(S)	● 47WI	● 52VI
(S) southern (C) central	● 4CA(S)	● 11IL	● 18MD	● 25NE	● 30NY(W)	● 36PA(W)	● 41TX(W)	● 48WY	● 53PC
(E) eastern (O) coastal	● 5CO	● 12IN	● 19MA	● 26NV	● 31NC	● 37RI	● 42UT	○ 49AK(N)	
(SE) southeastern	● 6CT	● 13IA	● 20MI	● 27NH	● 32ND	● 38SC	● 43VT	○ 49AK(S)	





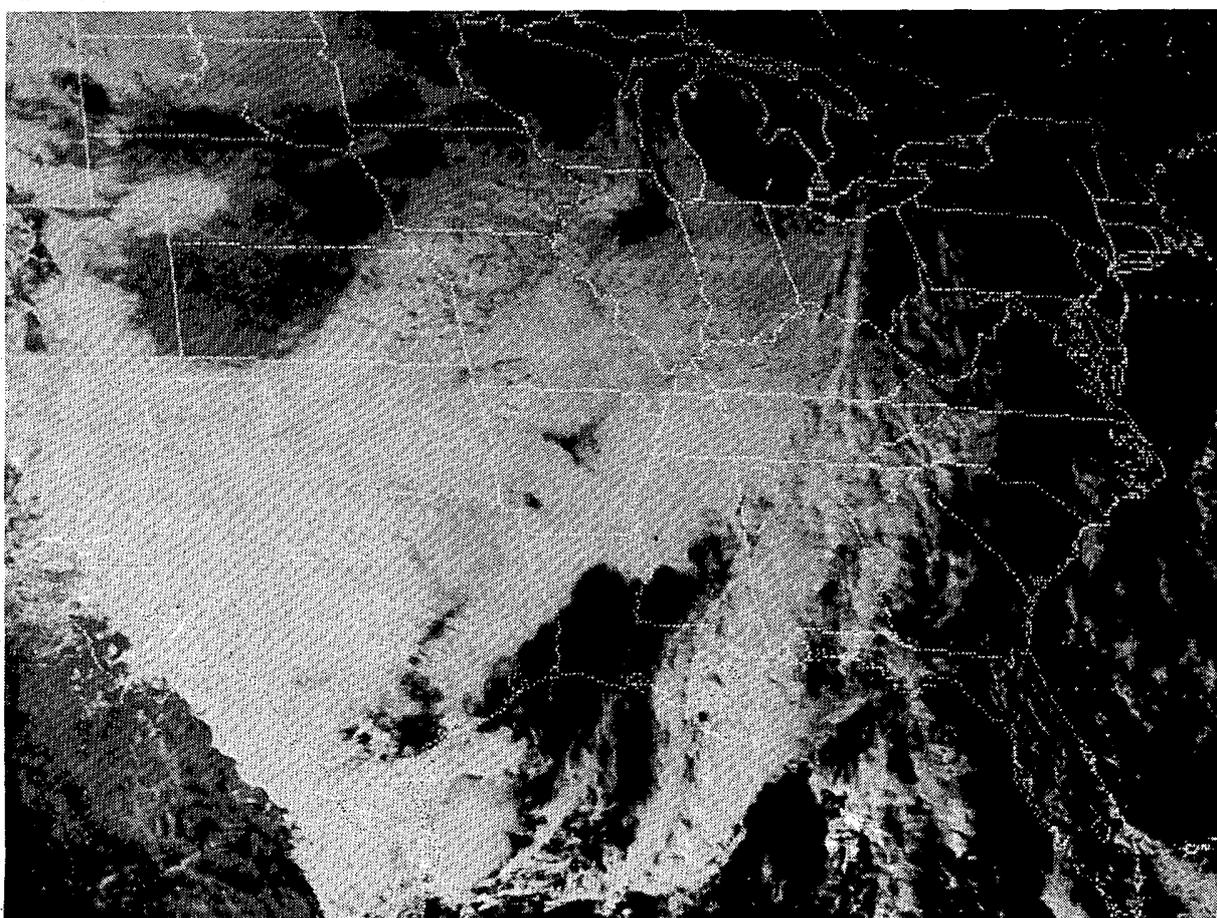
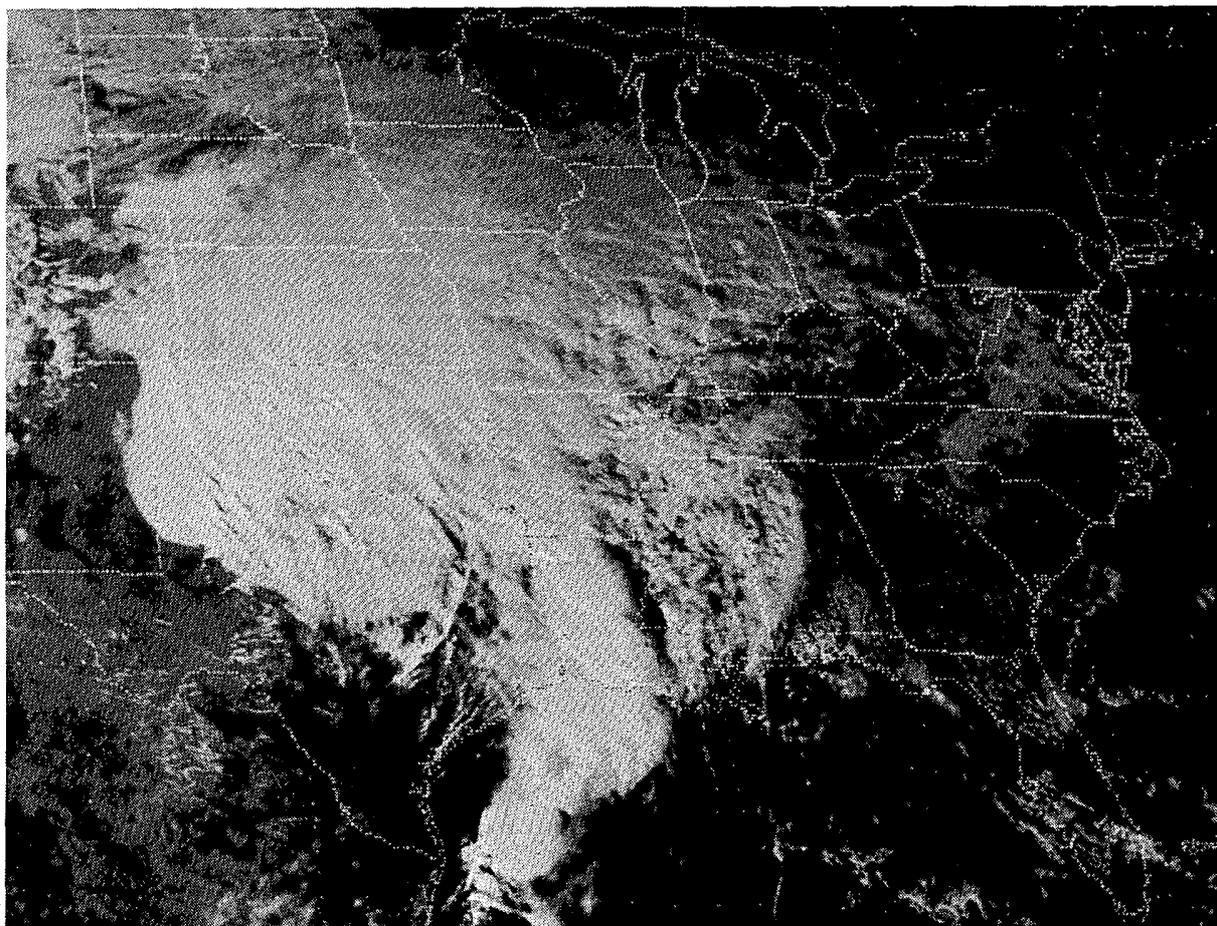
---Data base from NOAA/USDA Joint Agricultural Weather Facility.

**1. SNOWSTORM in the MIDWEST on December 31, 1984 to January 1, 1985**



A New Year's eve snowstorm dumped up to a foot of high water-content snow in a band extending from eastern Kansas to Lake Michigan. The adverse conditions produced by the storm put a damper on holiday festivities as slick and snow-clogged roads made travel difficult and hazardous throughout the region. An unofficial 19 inches of snow was reported at Antioch in extreme northeast Illinois, whereas only 60 miles to the south, southern Chicago had only 2 inches. ---Data supplied by NWSFOs at Des Moines, IA; Topeka, KS; St. Charles, MO; and Milwaukee, WI; and the Illinois State Water Survey, Champaign, IL.

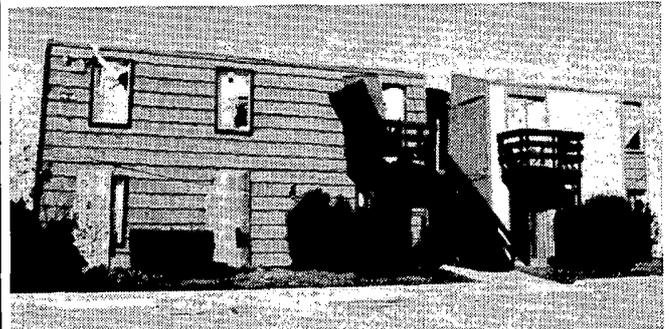
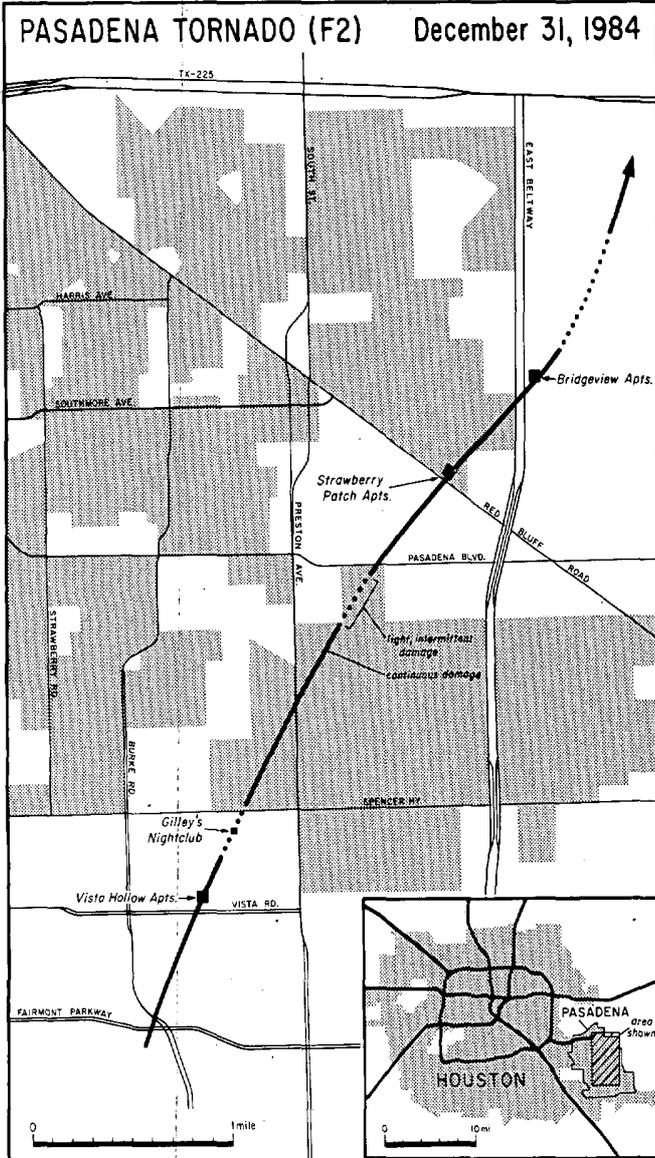
SNOWSTORM in the MIDWEST ---- continued



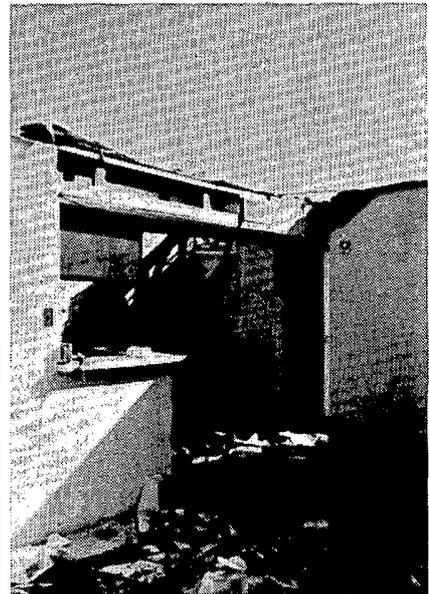
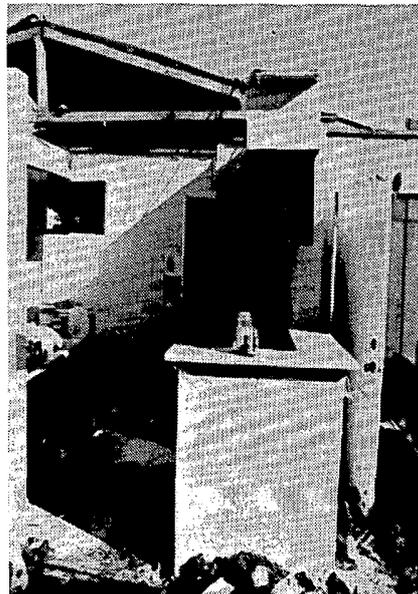
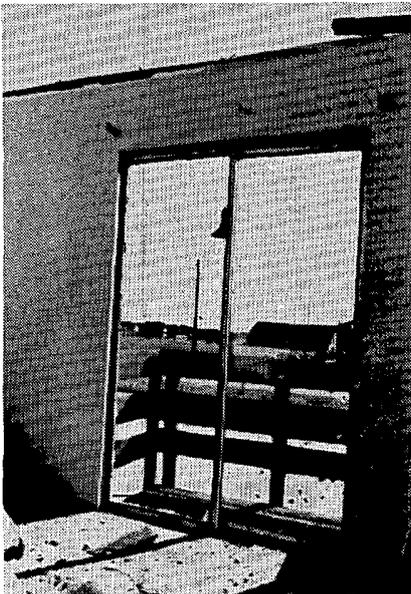
Two GOES East satellite, visible images of the storm at 1500CST on December 31, 1984 (top) and 24 hours later on January 1, 1985 (bottom). ---Photos from NESDIS.

## 2. TORNADO at PASADENA, TEXAS on December 31, 1984

At 1130CST on December 31st, a small but damaging tornado moved northeasterly through the Houston suburb of Pasadena. The area hit was very close to that struck by a tornado on October 22, 1984. Numerous apartment complexes suffered extensive damage in the densely populated area, and total damage estimates were in excess of \$10 million. Although no deaths occurred, 53 people were injured. The most serious injury was to a 24 year-old woman who lost a leg when the roof of an apartment unit at the Vista Hollow complex collapsed onto her. ---Map and all photos by Stephen W. Harned, Houston Area WSO, Alvin, Texas.



Two units at the Vista Hollow apartments that lost roofs and sustained window damage.

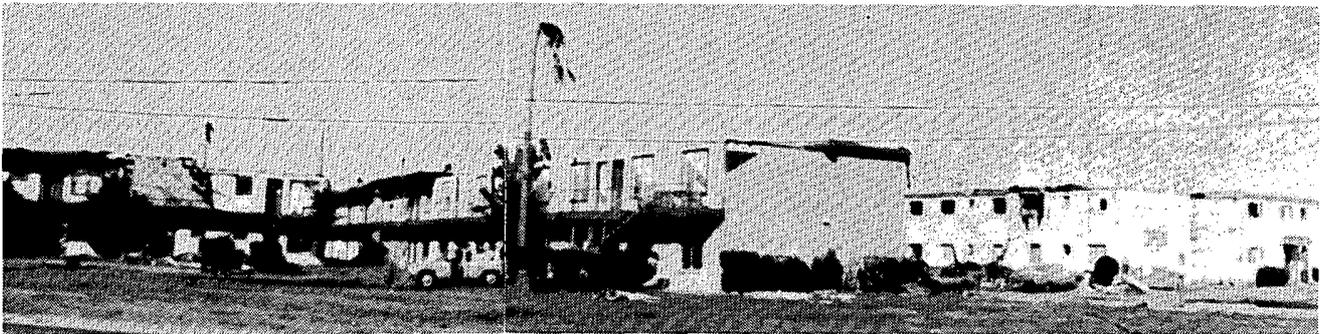


Three inside views of unroofed units at the Vista Hollow apartment complex.

TORNADO at PASADENA, TEXAS ---- continued



A small, unroofed business (right) and, just beyond and directly in the tornado's path, Gilley's C&W Nightclub that suffered only minor damage.



A northeast view of the Strawberry Patch Apartments on Red Bluff Road where the damage path was estimated to be about 75 meters (246 feet) wide.



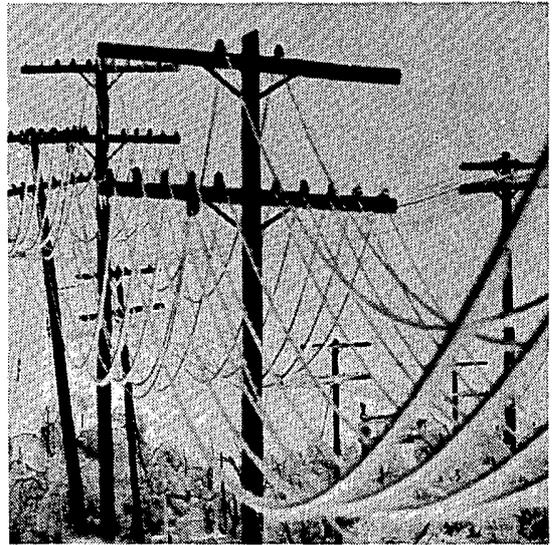
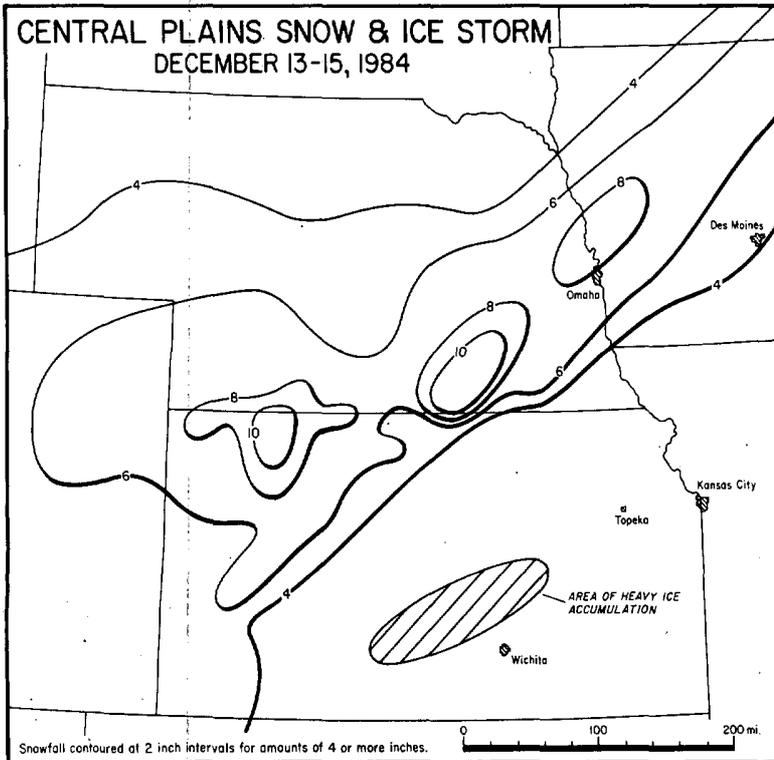
Close-up views of damage at the Strawberry Patch Apartments.

RIGHT: An unroofed unit of the Bridgeview Apartments (looking northeast) which were struck after the tornado crossed the East Beltway.

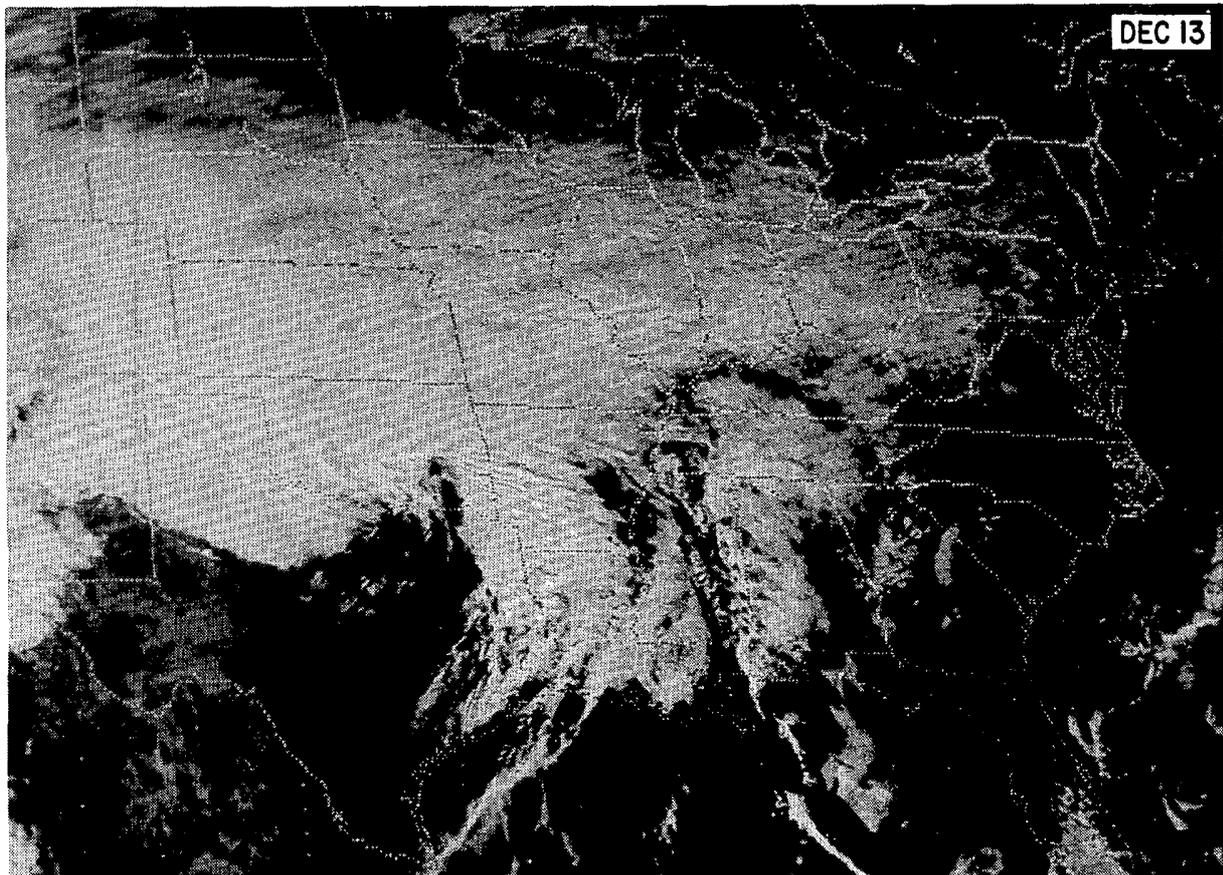


### 3. SNOW and ICE STORM in the CENTRAL PLAINS on December 13-15, 1984

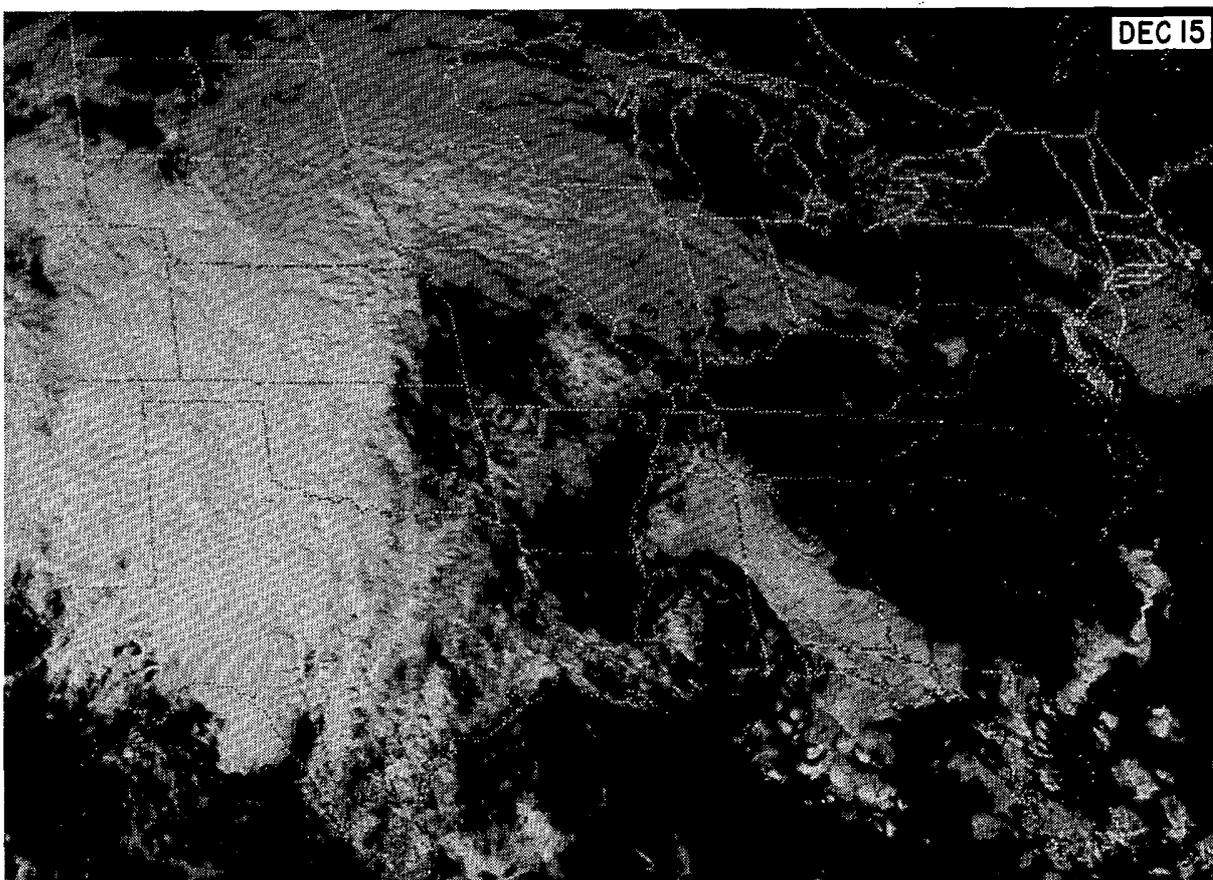
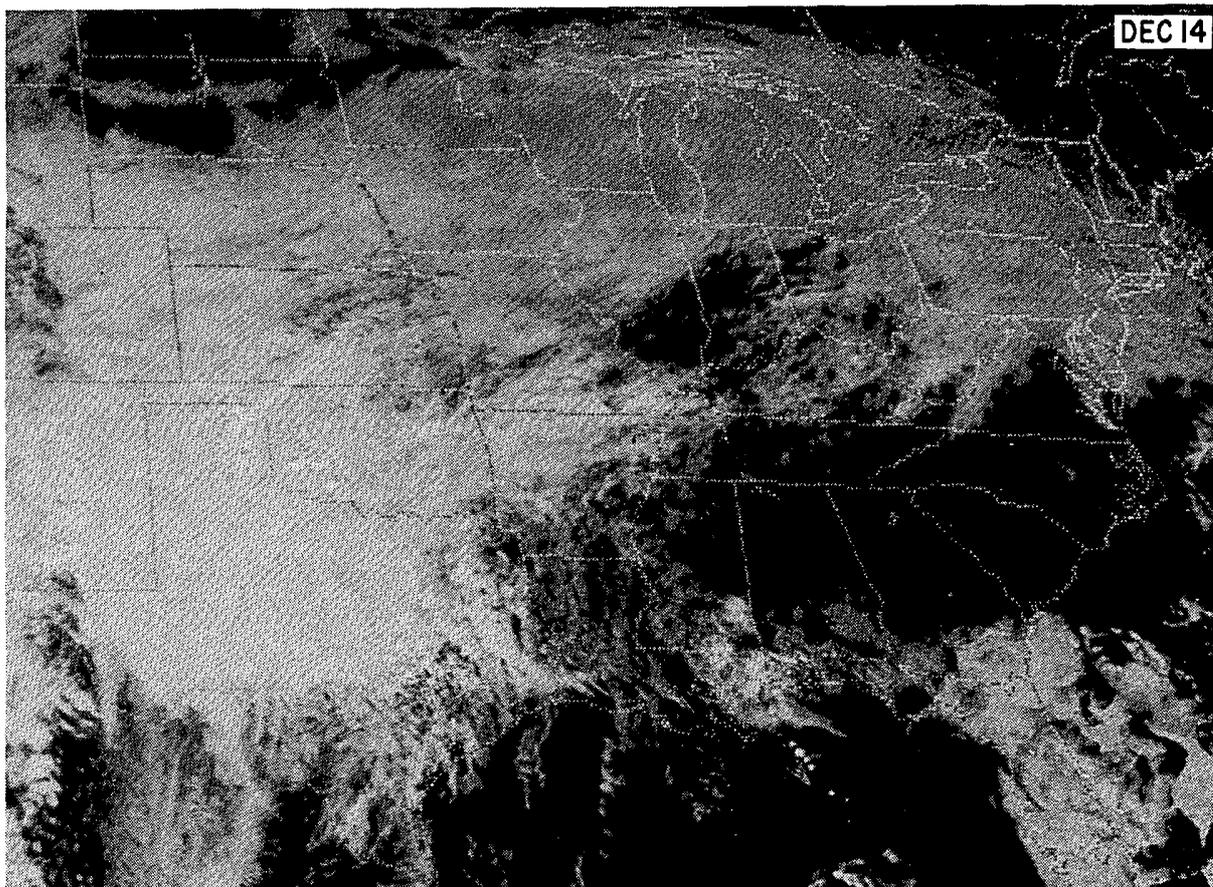
A winter storm produced snow over northwest Kansas and much of Nebraska on December 13th and 14th, while freezing rain over southwest and central Kansas persisted well into the 15th. The ice accumulation from the freezing rain was especially damaging in an area of south-central Kansas centered on Hutchinson (see map). The ice caused widespread tree and utility damage, resulting in power outages throughout the area. ---Data supplied by NWSFOs at Topeka, Kansas and Omaha, Nebraska.



Wires along a railroad in Hutchinson sag under the weight of accumulated ice. ---Photo by Larry Caldwell, The Hutchinson News.



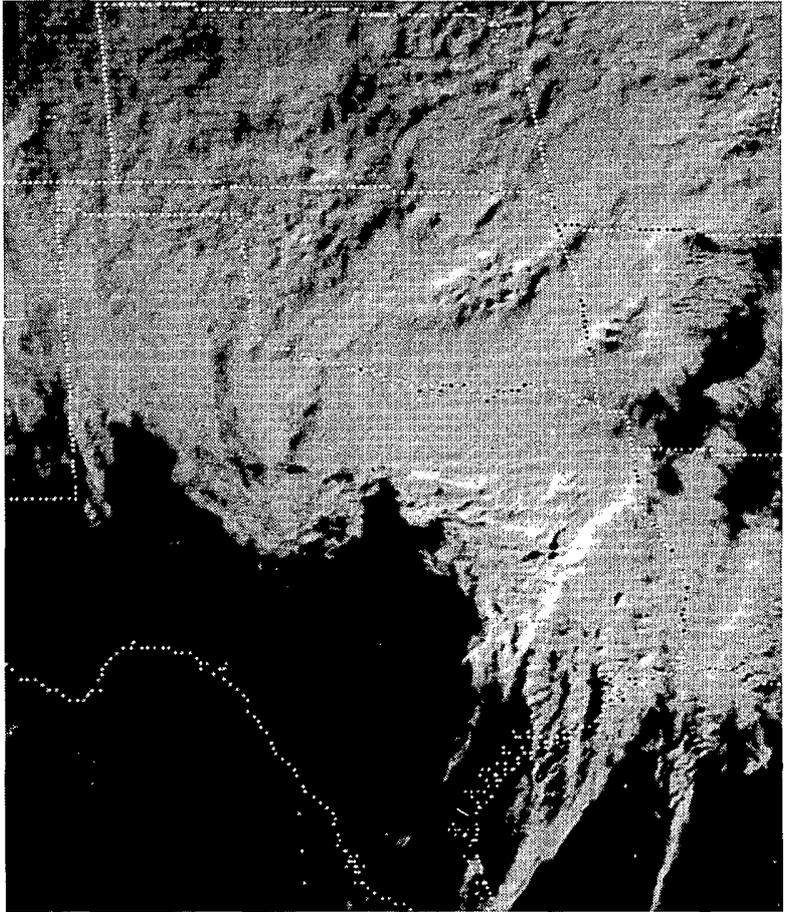
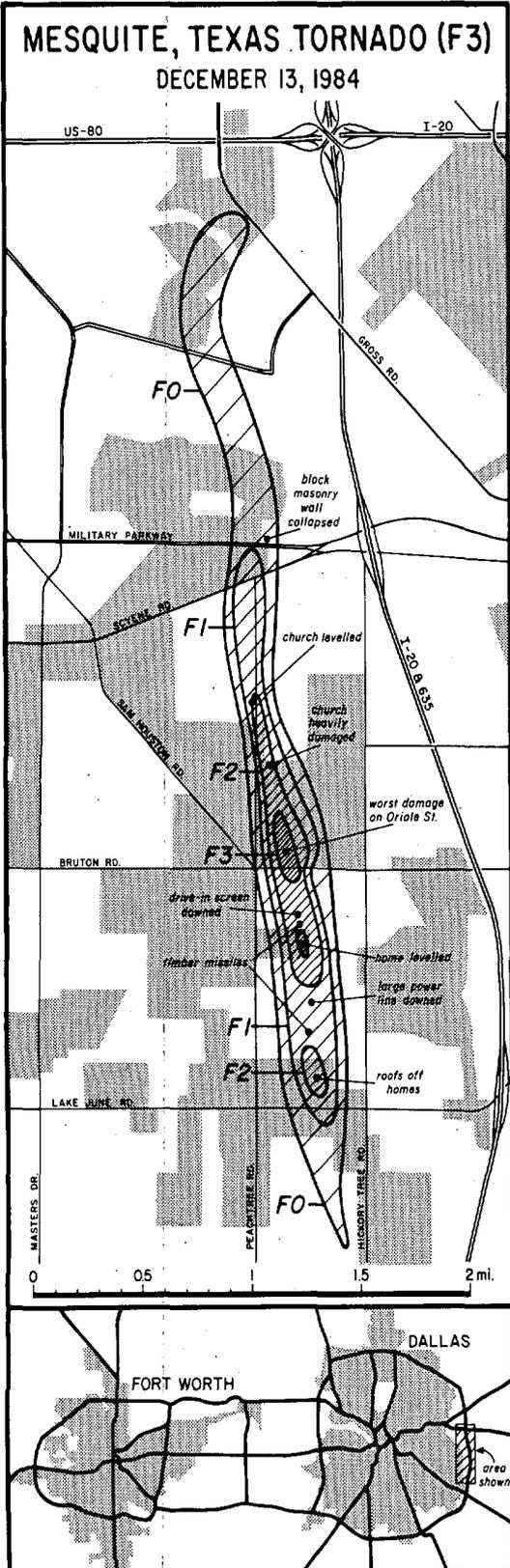
SNOW and ICE STORM in the CENTRAL PLAINS ---- continued



Three GOES East satellite, visible images on this and the previous page show that, in the wake of a small low-pressure system that raced from Oklahoma to the Great Lakes on December 13th and 14th, resurgency warm air from the Gulf of Mexico allowed freezing rains to continue over Kansas into the 15th. All photos were taken at 1330CST. ---Photos from NESDIS.

4. TORNADO at MESQUITE, TEXAS on December 13, 1984

As a winter storm moved northeastward out of western Texas on the morning of December 13th, thunderstorms over northern Texas produced an F3 tornado over eastern suburbs of Dallas. The tornado touched down in Balch Springs and moved rapidly northward, attaining F3 strength as it crossed Bruton Road into Mesquite (see map). Debris in its damage path, was blown northward and left no evidence of rotation. The tornado weakened as it continued through Mesquite, and left light, intermittent damage further north (off map) in Garland. No deaths occurred, although at least 28 people were injured. ---Map and all damage photos by Tim P. Marshall, Haag Engineering Co., Carrollton, TX.



A GOES East satellite, visible image of the storms over northern Texas at 0931CST, 15 minutes prior to the tornado touchdown. ---Photo from NESDIS.



A levelled Balch Springs home. Inspection of the foundation revealed there were no anchor bolts.

TORNADO at MESQUITE, TEXAS ---- continued



One of several large wood planks that was driven more than a foot into the soil.



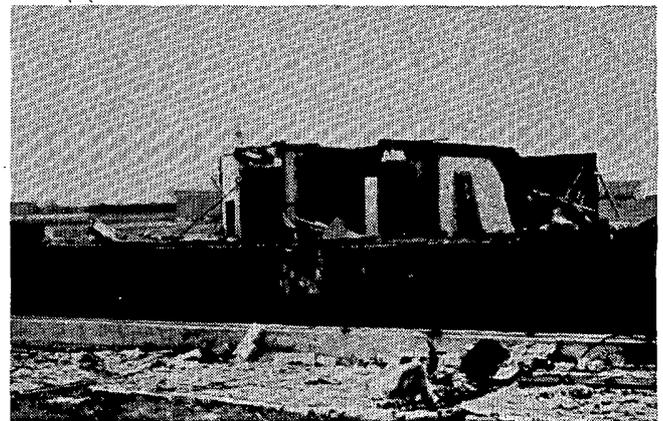
A wood frame house on Oriole Street in Mesquite that was moved more than 10 feet north off its foundation.



Debris strewn along Oriole Street in Mesquite where the most intense damage (F3) occurred.



A Mesquite home who's owner lost his roof but not his sense of humor.



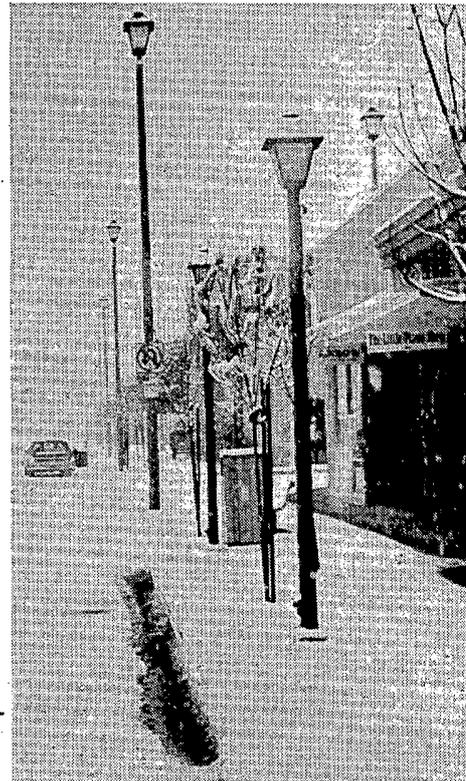
The destroyed Calvary Baptist Church in Mesquite, of which little was left standing.

## 5. SNOWSTORM in SOUTHERN CALIFORNIA on December 18-19, 1984

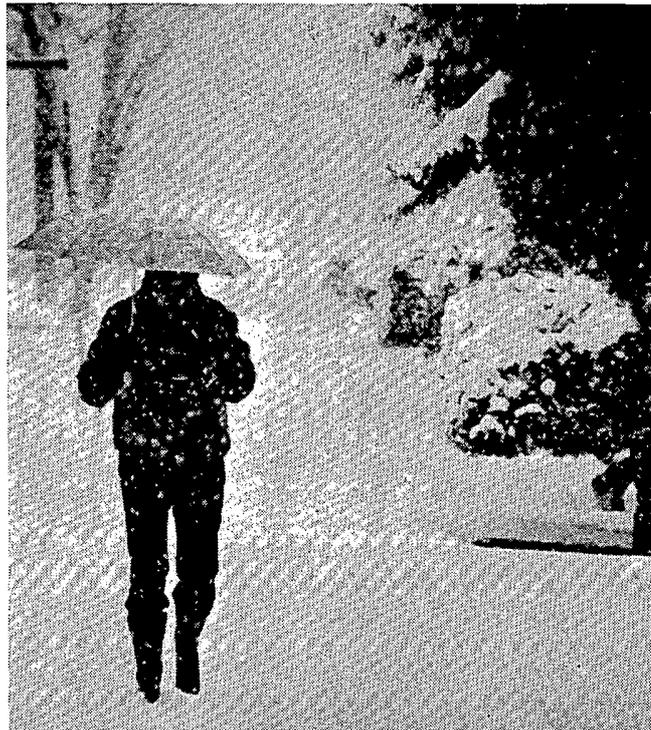
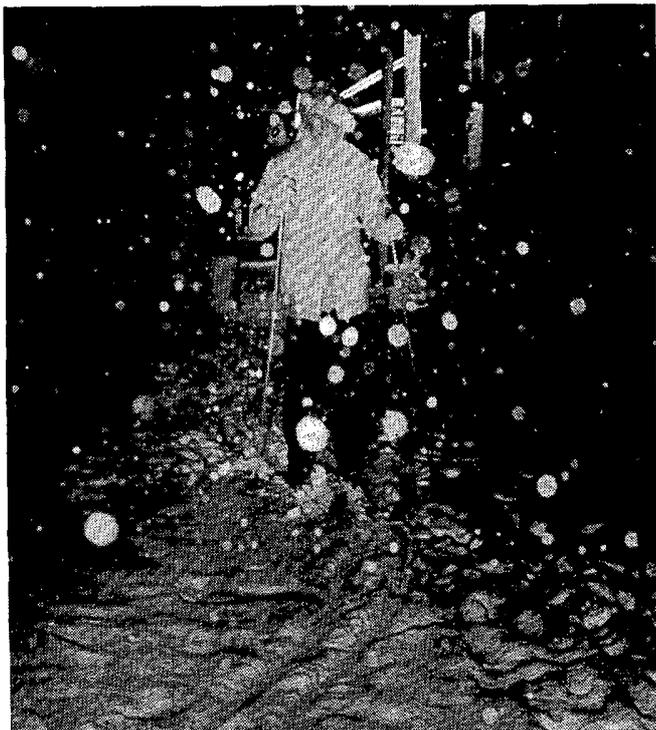
On December 18th and 19th, a winter storm that moved through southern California left an unusually heavy snowfall of up to 16 inches not only over the mountains, but over upper desert areas as well. Although snow in the desert areas is not uncommon, the accumulated depth was, and persistent cold temperatures following the storm allowed the snowcover to remain for several days. The snow downed tree limbs, caused widespread power outages, and made travel lengthy and hazardous through much of the Antelope Valley. Most highways leading north from Los Angeles to the upper desert, including Interstate 5, were closed. Edwards Air Force Base closed for the first time due to snow, and 38 desert area schools closed as well.



Desert palms in the Antelope Valley appear out of place in a dismal blanket of snow under cloudy skies.



RIGHT: A downtown Lancaster street gets a white dusting that eventually built up to 13 inches in depth.



Two Southern Californians exhibit differing means of dealing with the unusual snowfall.

SNOWSTORM in SOUTHERN CALIFORNIA ---- continued



Lancaster residents shovel snow from an awning that collapsed under the weight of the snow.



A desert resident who appears to be enjoying the rare experience of shoveling snow.



A plow, more commonly seen on nearby mountain roads, works to clear an Antelope Valley road.



Following the storm, cold and fog created icing conditions that left plants encased in ice, including roses in full bloom.

SNOWSTORM in SOUTHERN CALIFORNIA ---- continued



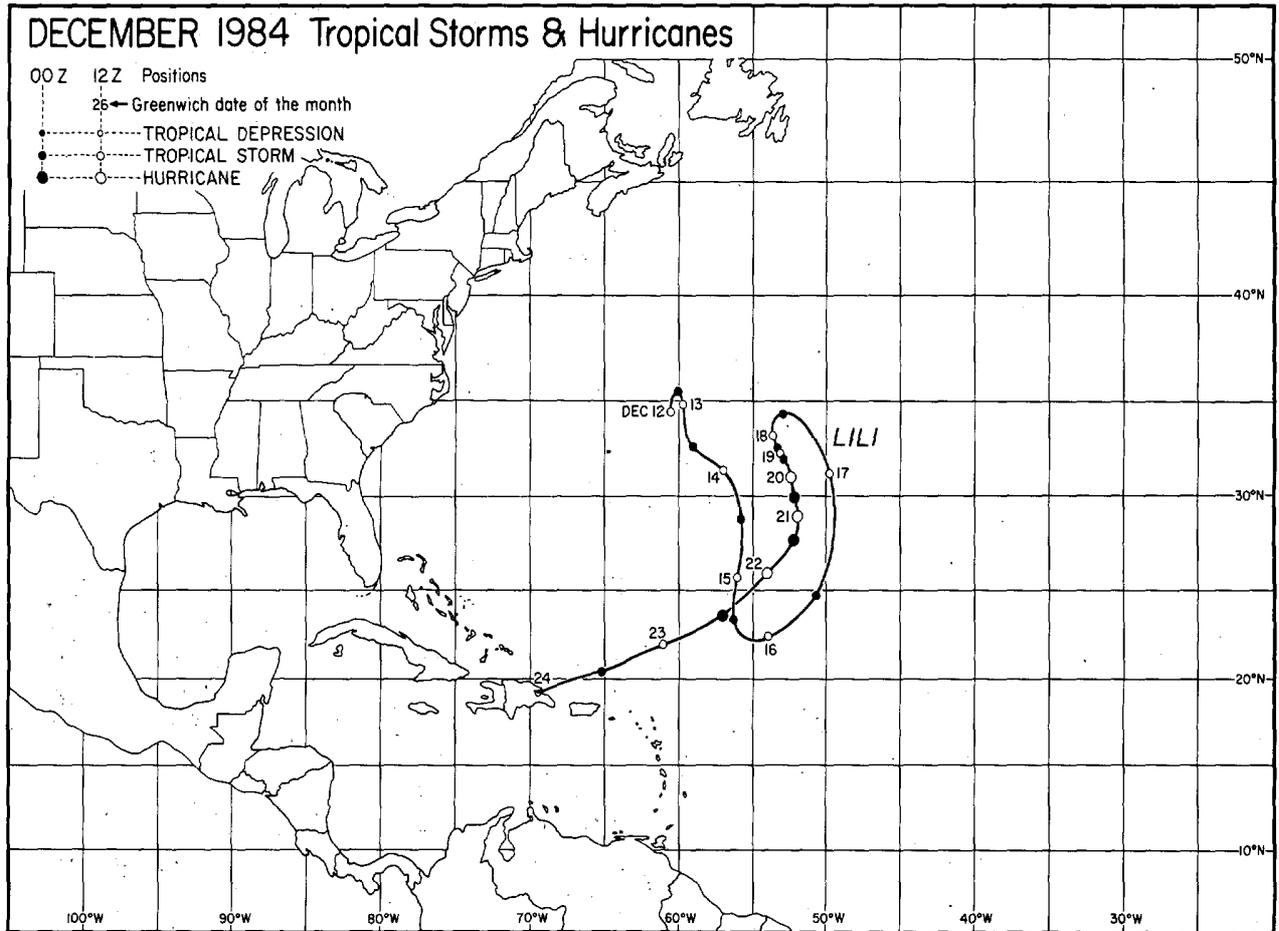
Despite the accumulated snowfall, fishing enthusiasts continued their vigil on Palmdale Lake. The San Gabriel Mountains appear in the background.



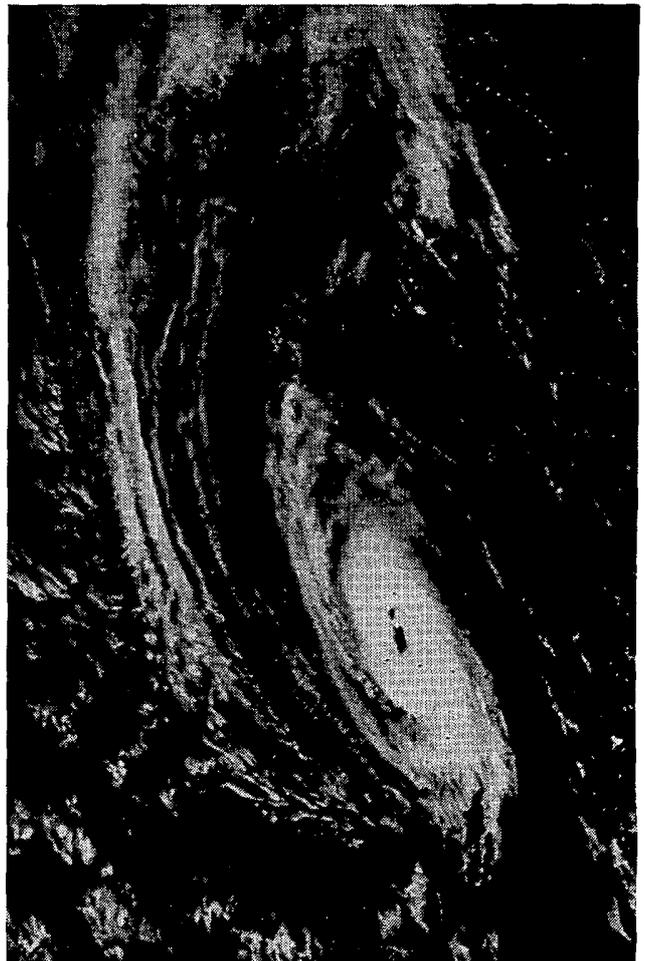
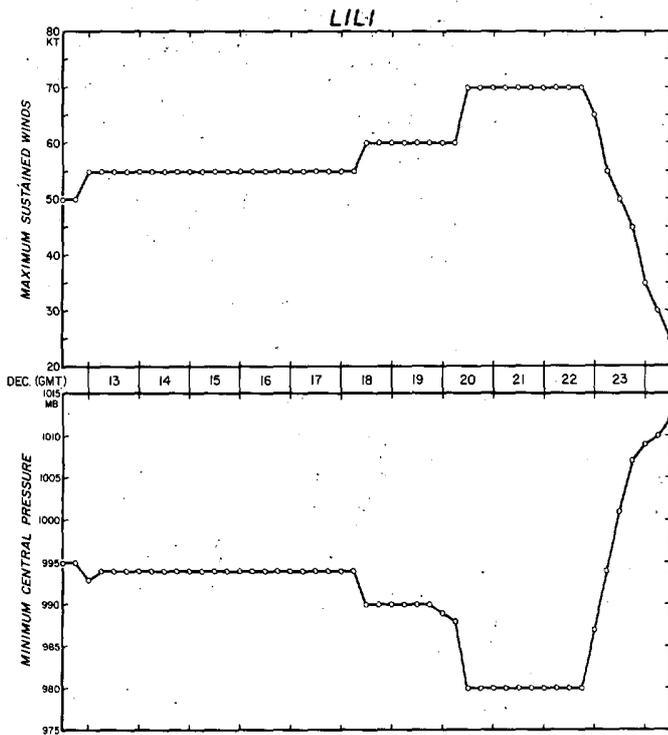
As usual after a snow, chain restrictions were enforced on roads through the mountains, but they would have been just as useful at lower elevations as demonstrated by the blanketed desert flora above.

---All photos on pages 12-14 from the Antelope Valley Press, Palmdale, California.

# TROPICAL STORMS AND HURRICANES



RIGHT: LILI, in hurricane stage, churns over the Atlantic in a GOES East satellite, visible photo taken at 1601GMT on December 22nd.



---All materials supplied by the National Hurricane Center, Miami, Florida.

# STORM DATA AND UNUSUAL WEATHER PHENOMENA

DECEMBER 1984

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	

## 1 ALABAMA

12 N Grove Hill, Clarke County 02 1440CST Hail  
Hail near 8/10 inch in diameter was reported.

## 2 ARIZONA

Cocconino County 15 1840MST 4 0 5 0 Snowstorm  
During a heavy snowstorm north of the Grand Canyon, a light plane crashed, killing 4 passengers.

Greenlee, Graham and Pima Counties 27-28 0 0 6 0 Flooding  
A storm system with considerable inflow of sub-tropical moisture produced rain of 1 to 3 inches over much of Arizona and southwestern New Mexico with the snow level 8000 to 9000 feet. Flood damage, however, was mostly confined to southeastern Arizona, especially along the Gila and San Francisco Rivers, which have their headwaters in southwestern New Mexico.

At Clifton, in Greenlee County, 300 residents were evacuated before the San Francisco rose to one foot over flood stage. Damage, however, was kept at a minimum.

At Duncan, also in Greenlee County, people from 125 homes were evacuated before a dike along the Gila River broke, sending waters up to three feet deep raging through the town. The sewage plant was destroyed and a dozen homes and several businesses had major damage. Estimate of damage to public structures alone was put at \$200,000 to \$300,000.

Safford, in Graham County, received only minor damage, but destruction to bridges and roads along the Gila River in Graham County was put at \$300,000.

In Pima County, damage to roads and bridges along the Santa Cruz River was estimated to be \$200,000.

## 3 ARKANSAS

Northwest Arkansas 04- early 0 0 ? - Heavy Snow  
05 evening to early morning

Snow began falling about 2130 CST on the 4th and continued until about 0800 CST on the 5th. All of the schools in the area cancelled classes on Wednesday. Many vehicles went out of control and crashed or went off the roads. Harrison and Fayetteville received 4 inches of snow. Other snow depths were 4 1/2 inches at Bentonville, 5 inches at Springdale, 7 inches at Mountain Home, and 7 1/2 inches at Yellville.

Northwest Arkansas 20- late 0 0 6 - Flash Flooding  
21 evening to early morning

About 4 inches of rain fell during a 24-hour period across the northwest corner of the State. The following counties were primarily affected by the heavy rain and subsequent flooding: Benton, Carroll, Boone, Marion, Washington, Madison and Newton. Flooding was reported at Bella Vista, Bentonville, Rogers, Springdale, Siloam Springs, and Harrison. Schools in Carroll County closed because of flooded bus routes. Several cars were washed off roads by rushing waters. The approach to a bridge was washed out in Yellville. Three bridges were completely destroyed in Benton County. Several low water bridges were damaged, especially in Carroll County.

## 4 CALIFORNIA Northern

Del Norte County, south to Mendocino County 17-18 Both Days 0 0 ? ? Snowstorm  
6-12 inches of snow fell on the mountain passes of Northwest California, leaving a six to ten foot snow depth on the ground at elevations above 6000' from a series of storms in late November and early December.

Kern and Tulare Counties 19 All Day 0 0 0 0 Snowstorm  
Low pressure aloft spread 6-18 inches of snow across the southern portions of the Sierra Nevada Range. 8-12 inches were on the ground at Lake Isabella, and 14-18 inches at Tehachapi Pass.

## 4 CALIFORNIA, Southern

Los Angeles, Los Angeles County 12 1800PST 0 2 ? 0 High Winds through 13  
Extreme winds blew out windows in several high-rise apartment buildings and downed numerous power lines in Los Angeles. Extensive power outages resulted, knocking out traffic lights. Two men were critically burned when they touched a chain link fence that was in contact with a live power line.

Palm Springs, Riverside County 12 0 0 0 0 High Winds  
Dust storms reduced visibilities to ten feet at Palm Desert.

Perris, Riverside County 13 2 21 ? 0 High Winds

Clouds of dust lifted by high winds reduced visibilities, causing a fourteen car accident that claimed two lives and injured several people. Nine other two-car accidents in the same dust storm resulted in twenty-one injuries.

Southern California 18- 1 0 ? 0 Winter Storm  
19

A winter storm dumped heavy snow and rain over much of Southern California on December 18th and 19th. Heavy snow of up to 16 inches fell in the mountains and upper desert areas. All schools in the Antelope Valley were closed on both days, as was Edwards Air Force Base. The Antelope Valley Freeway and other major highways leading to upper desert communities and mountain areas were also closed. On the 18th, about 40 trucks became stuck in snow and mud on Interstate 5 near Tejon Pass. The road was then closed from Castaic to the Tehachapis due to heavy snow. In Ventura County on the 18th, lightning struck a large power transformer, causing an explosion that damaged four houses.

On the 19th, an eleven year old girl drowned in the swollen Ballona Creek near Marina Del Rey in Los Angeles County when swept from the grasp of two schoolmates who tried to save her, and the Tom Bradley Terminal at Los Angeles International Airport was closed to incoming flights when accumulated rainwater damaged the passenger area. In Orange County, mudslides in Mojoka and Silverado Canyons left slush and debris up to two feet deep.

## 5 COLORADO

Northeast Colorado 9 morning 0 0 0 0 High winds  
Around 2AM, a wind gust of 69 mph was recorded at Golden Gate Canyon, in the foothills west of Denver. Strong winds also blew on the plains, reaching speeds of 60 mph at Merino, in Logan County.

Statewide 11-13 0 0 0 0 Snow  
Almost all areas of Colorado received moderate to heavy snowfall during this period. 10 to 20 inches fell at most spots in the mountains, mostly on the 11th and 12th. 6 inches fell at Denver and Colorado Springs, hampering airport operations in both cities. Schools were closed in some rural areas of eastern Colorado: 9 inches of snow buried Julesburg, with 7 inches at Trinidad. The western valleys also received considerable amounts of snow, with 8 inches at Cortez, 16 inches at Durango, and 5 inches at Craig.

Northeast Foothills 22-23 0 1 5 0 High winds  
Strong chinook winds howled along the Front Range foothills. At Table Mesa in southwest Boulder, gusts reached 108 mph at 339AM on the 23rd, and again at 1030AM. Gusts of 79 mph were clocked at Golden Gate Canyon and just west of Colorado Springs, with winds of 60 to 75 mph noted at Fort Collins and Estes Park. Speeds reached 94 mph at 525 AM on the 23rd in east Boulder; the recording station there had sustained winds of 50 to 60 mph for several hours. The winds flattened a two floor cinder block building under construction in Boulder, causing over \$75,000 damage; debris from the building slightly injured a policeman. At least one chain link fence was also blown down. Dozens of windows and roofs were damaged in Boulder, along with mobile homes and cars. Numerous trees and power lines were downed. A giant plastic bubble dome was blown apart and collapsed, causing at least \$100,000 damage. Farther south, strong gusts knocked two large trucks on their sides on Monument Hill, just north of Colorado Springs.

Southwest Colorado 27-28 0 0 0 0 Snow, rain  
A storm of tropical origin dumped 26 inches of wet snow at Wolf Creek Pass in the San Juan Mountains. Nearby, 20 inches fell at Red Mountain Pass, with 15 inches at the Purgatory ski area. The storm contained unusually warm air for this time of year, and rain fell at elevations up to 9 thousand feet. 1 1/2 inches of rain fell at both Durango and Pagosa Springs in the Four Corners area.

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					KILLED	INURED	PROPERTY	CROPS	

## 6 CONNECTICUT

North Haven	03	1620EST			0	0	4	0	Downburst Wind
<p>Extensive glass and window damage occurred at two industrial plants on Sackett Point Road. As many as twenty cars in the parking lot were damaged by gravel blown from the roof, pitting the painted surfaces. The force of the wind sounded like an explosion according to the plant manager. Vents were blown off the roof and an overhead door was lost at Nutstone Industries.</p>									
New Haven area	03	Late afternoon			0	0	0	0	Lightning
<p>Thunderstorms in the area with lightning strikes caused several brief power outages in Milford and Orange. A lightning strike in Seymour set off fire alarms and knocked out telephones in an industrial park.</p>									

7 DELAWARE ————— NONE REPORTED

8 FLORIDA ————— NONE REPORTED

## 9 GEORGIA

Gwinnett County	02	1900EST			0	0	2	0	Lightning
<p>Lightning damaged equipment at a police radio transmission relay site in Lawrenceville.</p>									
Upson County	02	1920EST			0	0	3	0	Wind
<p>Thunderstorm winds blew a tree down onto a trailer south of Thomaston.</p>									

10 IDAHO ————— NONE REPORTED

11 ILLINOIS ————— NONE REPORTED

12 INDIANA ————— NONE REPORTED

## 13 IOWA

Statewide	13	Evening-			0	0	4	0	Snowstorm with
	14	Daytime							Freezing Rain
<p>Snow began falling in Northern Iowa in early evening and spread across the State. The snow was occasionally mixed with rain and freezing rain, especially in the Southeast. Accumulations were mostly one to four inches, but amounted to five to seven inches in the Southwest and West Central Iowa.</p>									
Statewide	17	Morning- Afternoon			0	0	4	0	Freezing Drizzle
<p>Freezing drizzle moved into Western Iowa in the early morning hours, spread to Central Iowa by midmorning and reached Eastern Iowa in the afternoon. Although the layers of ice that coated the streets was very thin, it was enough to cause all kinds of problems for motorists and pedestrians.</p>									
Statewide	29	Daytime			0	0	0	0	Record Warmth
<p>New record high temperatures were set for the day at almost every station in Iowa, and the record high for the month was tied at Des Moines and Lamoni.</p>									

## 14 KANSAS

Northwest Kansas	13-	0000-			0	0	5	0	Heavy Snow
	14	0600CST							
<p>Heavy snow closed schools and made travel difficult throughout Northwest Kansas. Greatest amounts fell at Oberlin (13 inches) and Dresden (11 inches) in Decatur County. Depths of 6 inches or more were measured at most spots north of a line from Goodland to Scott City and Phillipsburg.</p>									

## KANSAS

Southwest and Central Kansas	13-	0000-			0	0	7	0	Ice Storm
	15	2000CST							
<p>Freezing drizzle and freezing rain fell upon most of Southwest and Central Kansas. Thunderstorms on the 14th dropped heavier rains over a path about 50 miles wide centered on a line from Greensburg to Council Grove in the central part of the state. Accumulations were great enough to cause tree damage and minor utility outages throughout the affected area. Serious damage to utilities was confined to the area between Greensburg and Council Grove, however. Hutchinson was hit especially hard, and at one time more than 12,000 homes were without power there.</p>									
East Central Kansas	31	0600-			0	0	4	0	Heavy Snow
		2400CST							
<p>Heavy snow that began as sleet closed roads and schools throughout East Central Kansas. More than 6 inches accumulated in an area 70 miles wide centered on a line from Emporia to Leavenworth. Easton, in Leavenworth County, measured 10 inches; Topeka and Lebo both had 8 inches.</p>									

## 15 KENTUCKY

Statewide	05	ALL DAY			2	Many	6	0	Winter Storm
<p>A pre-season winter storm brought a mixture of freezing rain, sleet and heavy snow across Kentucky. 5 to 10 inches of snow fell across the west and north central areas with 1 to 4 inches over the south central and east. At least 2 traffic fatalities were reported as well as many injuries. Traveling through some parts of the state became almost impossible. Many schools and businesses were closed.</p>									

## 16 LOUISIANA

Acadia Parish	02	1013CST							Funnel Cloud
<p>A funnel cloud was sighted by state police 5 miles east of Duson. No damage was reported.</p>									
Ascension Parish	02	1330CST							Hail
<p>A severe thunderstorm produced hail 1.5 inches in diameter at Donaldsonville. No damage reported.</p>									
Cameron Parish	31	1410CST					3		High Wind
<p>High wind caused minor damage in the Cameron area.</p>									
Acadia Parish	31	1420CST					4		High Wind
<p>High wind destroyed several outbuildings east of Mermentau.</p>									
Lafayette Parish	31	1530CST					4		High Wind
<p>High winds caused minor damage 8 to 10 miles west of Lafayette.</p>									

17 MAINE ————— NONE REPORTED

18 MARYLAND and D.C. ————— NONE REPORTED

19 MASSACHUSETTS ————— NONE REPORTED

20 MICHIGAN ————— NONE REPORTED

21 MINNESOTA ————— NONE REPORTED

22 MISSISSIPPI ————— NONE REPORTED

23 MISSOURI ————— NONE REPORTED

# STORM DATA AND UNUSUAL WEATHER PHENOMENA

DECEMBER 1984

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>24 MONTANA</b>											
Big Horn, Treasure, Rosebud, Carter, and Powder River Counties	23	All Day			0	0	0	0	0	0	Heavy Snow
	Eighteen to thirty inches of snow fell over the Southeast portions. Little wind accompanied the storm, and there were no reports of livestock losses.										
Lincoln, Sanders, and Flathead Counties	27: 28: 29:				0	0	0	0	0	0	Heavy Snow
	Two to four feet of snow fell over much of the Northwest. No major problems were noted. Electricity was out in parts of Lincoln County for over 24 hours.										
<b>25 NEBRASKA</b>											
Otoe County	09:	0630CST			0	0	0	0	0	0	Wind
	A wind gust to 58 m.p.h. was measured during a thunderstorm at Nebraska City.										
Panhandle and Central Nebraska	11: 12:	Evening to Early Morning			0	0	0	0	0	0	Heavy Snow
	Pockets of snow to around 4 inches fell in a band about 25 miles wide from near Sidney to Ord.										
Panhandle, Southwest, South Central, and East Central Nebraska	13: 14:	Daytime to Early Morning			0	0	0	0	0	0	Heavy Snow
	Snow fell during the day in the Panhandle and southwest Nebraska and spread into east central areas by late afternoon. Four inches or more of snow fell south of a line from Scottsbluff to Sioux City and north of a line from Barneston to Auburn. A band of heavier snow of 8 inches or greater fell in an area about 40 miles wide from Superior to Omaha. In this area, Fairmont reported 11 inches and Hebron 10 inches.										
South Central and Eastern Nebraska	14: 15:	Late Night to Mid Morning			0	0	4	0	0	0	Ice Storm
	Freezing rain glazed surfaces generally south of a line from near McCook to North Platte to Sioux City. The freezing rain was particularly heavy during the early morning in south central and southeast Nebraska in an area about 50 miles wide along and north of the Kansas border from Red Cloud to Falls City. Some damage to trees and utility lines was reported in this area.										
Southeast Corner of Nebraska	31: 01:	Evening to Morning			0	0	0	0	0	0	Heavy Snow
	Snow accumulated to around 4 inches at Falls City.										
<b>26 NEVADA</b> ————— NONE REPORTED											
<b>27 NEW HAMPSHIRE</b> ————— NONE REPORTED											
<b>28 NEW JERSEY</b>											
Statewide	27	all day			0	0	0	0	0	0	Snow Storm
	A surprise winter storm blanketed New Jersey with record breaking snowfall for the day. The snow began about 0100 EST and started piling up almost immediately, sending road crews scurrying to begin sanding and plowing treacherous roads. Accumulations differed across the state, ranging from a light dusting in the southern areas and 4.7 inches recorded at Newark International Airport to more than half a foot at Rifle Camp in West Paterson.										
<b>29 NEW MEXICO</b>											
Lincoln County	20	All Day			-	-	5	0	-	-	Flash Flood
	Warm rains began falling the night of December 19, and by the morning of the 20th, watercourses in the Rio Grande area had overflowed, causing damage to roads and a sewage plant.										
Catron, Grant, Hidalgo, and Luna Counties	27- 28:	Night and All Day			-	-	7	0	-	-	Flash Flood
	Warm rains began falling the evening of December 27, and by midnight the first river overflowed, followed by the Gila, San Francisco, and Mimbres reaching flood stages. Damages totaled near fourteen million dollars. Bridges, crops, and public works were destroyed.										
<b>30 NEW YORK, Coastal</b>											
Extreme SE Nassau Co, Suffolk Co., New York City, and Westchester	27	all day			0	0	0	0	0	0	Snow Storm
	The whimsical snowstorm that pelted the Coastal Area and broke snowfall records for the day left weather forecasters befuddled, highway workers frustrated and road conditions ranging from slippery to treacherous. The storm began shortly after 0100 EST and lasted more than 12 hours. 4.8 inches fell in Central Park, breaking the snowfall record for that day.										
<b>30 NEW YORK, Central</b>											
Areawide	03	Early PM			0	0	4	0	0	0	Winter Storm
	Snow hit Eastern New York on Monday afternoon. Snow cover amounted from 4 to 8 inches over most of the area. Hamilton County got the bulk of the snow with over 2 feet reported at Inlet. Some minor accidents were reported.										
Areawide	05	Early PM			0	0	4	0	0	0	Winter Storm
	A winter storm hit New York on Wednesday afternoon. The storm brought several inches to Eastern New York. Rte. 2 in Rensselaer County had to be closed for a time while road crews cleared the snow. Quite a few minor accidents took place in the area. Scattered patches of freezing rain/mist were reported by local police agencies in Eastern New York. The hardest hit area was a band from Binghamton, Northeast through Fulton and Saratoga Counties into Burlington, Vermont.										
Areawide	15	PM			0	0	?	0	0	0	Rain/Freezing Rain
	Wet weather brought a mixture of conditions to Eastern New York. In most areas light rain fell, but in higher elevations rain turned to freezing rain, coating all exposed surfaces.										
Areawide	21	Early AM			0	4	5	0	0	0	Rain/Ice Storm
	Sleet, freezing rain and some light snow moved into Eastern New York very early Friday morning. As a result, ice covered most roads, causing several accidents. In addition, ice-coated power lines came down, causing local power outages.										
Areawide	28	Early AM			0	7	6	0	0	0	Sleet/Ice Storm
	Sleet and freezing rain caused local power outages, as well as many traffic accidents. In Plattsburg, Clinton County, roads were so bad, local mail delivery was suspended. Several persons were injured by slips and falls.										
St. Lawrence, Herkimer, Hamilton, Franklin, Onieda, Clinton, Essex and Warren Counties	31	Early AM			0	9	7	6	0	0	Flood
	Over 6 inches of rain, combined with temperatures in the 40s and 50s, produced record flooding in the Adirondacks. Several dams were overtopped during the storm. Denley Dam on the Lewis/Onieda County line had several inches of water in the generator room. Hundreds of state, county and town roads were damaged. The Ballardville Dam in Malone, Franklin County, was breeched by high water on the Salmon River. More than 50 bridges had to be closed to traffic because of undermining. Over 1,500 persons had to be evacuated in Northern New York. Over 25 towns were declared to be in a state of disaster. The village of Tug Hill was isolated as the only bridge in town was washed out. Some rivers that flooded included: Raquette, Black, Salmon, Grass, Moose, Independence, Sugar, Saranac, Great Chazy, Bouquet, Ausable and the Upper Hudson River at North Creek in Warren County. The resulting floods were described by many to be the worst in over 75 years. Many rescues were reported as victims had to be pulled from raging flood waters.										
<b>30 NEW YORK, Western</b>											
Livingston County	04	Afternoon			-	-	3	-	-	-	Wind
	Strong winds blew over a mobile home that was being hauled by a truck on Route 15A in Lima, northern Livingston County.										
Many parts of Central and Western New York	05- 06:	Evening to Morning			-	-	5	-	-	-	Snow
	Heavy snowfall of up to a foot paralyzed many communities in western and central New York. Schools had to be closed. Airlines had to cancel flights. Many passengers were stranded. There were numerous vehicular accidents that resulted in minor injuries. Most parts of Oswego County received a foot of snow while many portions of Lewis and Jefferson Counties got more.										

# STORM DATA AND UNUSUAL WEATHER PHENOMENA

DECEMBER 1984

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>NEW YORK, Western</b>									
Lewis, Jefferson, Oswego, Erie, Monroe, and Niagara Counties	28-31						6		Rain
	<p>On December 28th through the 29th, heavy rain fell over western and central New York. The eastern Lake Ontario Counties of Oswego, Lewis, and Jefferson received from 3 to 6 inches of rain while western and central New York got 1 to 2 inches.</p> <p>The copious rainfall caused the Black River at Watertown to crest on the 31st at its highest stage in 64 years of record keeping. Many of its tributaries flooded.</p> <p>In Lewis County, 17 bridges were damaged. Many roads were eroded and impassable for a few days. Vast low-lying farmlands were covered with water up to 3 feet deep. Cattle had to be evacuated. Lewis County suffered damages worth about a million dollars.</p> <p>Sand-bagging operations had to be put in action and residents were evacuated in Pulaski and Altmar along the Salmon River in Oswego County. Many homes suffered extensive damages. A few roads and bridges in the county were damaged. Oswego County officials claimed damages approaching two million dollars.</p> <p>Jefferson County also suffered heavy losses. Many miles of roads were rendered impassable. In Watertown, pumps had to be activated and machineries had to be moved to higher ground. The town of Dexter, at the mouth of the river, suffered industrial damages. An estimate of flood damage in the county is not available.</p> <p>Governor Cuomo declared Lewis, Jefferson, and Oswego Counties among the disaster areas in the state.</p> <p>In western New York, some flooding occurred along the Oatka, Cazenovia, Cayuga, Tonawanda, and Ellicott Creeks. There were reports of basement floodings, and closures of roads and underpasses.</p>								
<b>31 NORTH CAROLINA</b> — NONE REPORTED									
<b>32 NORTH DAKOTA</b>									
Northeast	16				0	0	0	0	Blizzard
	<p>A blizzard with strong winds (gusts to 47 mph at Grand Forks in Grand Forks County), heavy snow (5 inches at Walhalla in Pembina County and 6 inches at Hurricane Lake in Pierce County) and wind chills of 30 to 45 below made travel dangerous. During the blizzard cars went off the road into ditches, plane flights were delayed or cancelled, and church and social events were cancelled.</p>								
Northeast	21	Afternoon			0	0	0	0	Winter Storm
	<p>A winter storm with strong winds, snow and blowing snow, and wind chills of 20 to 40 below forced the cancellation of classes and sporting events.</p>								
<b>33 OHIO</b> — NONE REPORTED									
<b>34 OKLAHOMA</b>									
West, North and Central Sections	4-5				0	0	?	?	Winter Storm
	<p>An early snow storm broke many records for so much snow so early in the month. Five to seven inches were common with reports of 10 inches in Skiatook, Osage County. The weight of the snow downed many tree limbs and power lines in Tulsa and southern Osage Counties.</p>								
Northwest Sections	13-15				0	0	?	?	Ice Storm
	<p>A winter storm consisting of freezing rain and sleet left ice accumulations of 1 to 2 inches on trees and power lines. The weight of the ice downed power lines and power poles causing about 6000 residents to be without electricity for a week. The damage to trees was severe and some trees were uprooted by the weight of the ice.</p>								
Cherokee County	21-23				0	0	?	?	Flooding
	<p>Rainfall averaging 3-4 inches occurred across the Illinois River basin, causing minor flooding over the county. The Illinois River crested at 20.7 feet on the 22nd. A few residents were required to evacuate as water had entered their homes. Highway 10 north of Tahlequah was closed for 1½ hours. No estimate of damage was available.</p>								
<b>OKLAHOMA</b>									
Millerton, McCurtain County	31	1415GST			0	2	5	7	Wind
	<p>A thunderstorm produced strong winds which blew one mobile home into a house and turned another mobile home over. The mobile homes were destroyed. Damage was done to the one house and considerable shingle damage occurred to other homes in the area. Damage estimated at \$100,000.</p>								
Northwestern Two-thirds	31	daytime-evening			0	0	?	?	Winter Storm
	<p>Rain changing to freezing rain and sleet spread across parts of the state. Many roads were closed due to icy conditions, including I-40 which was closed for 12 hours from El Reno to Elk City.</p>								
Southwest-Northeast	31	daytime-evening			0	0	?	?	Flooding
	<p>Three to four inches of rain during a 12 hour period caused local flooding across southwest, central, and northeast sections. Many county roads were under water and many small streams overflowed their banks.</p>								
Mayes County	31	evening			0	0	?	?	Flooding
	<p>Rainfall of 3 to 4 inches in less than a 12 hour period caused Pryor Creek to flood portions of Mayes County, and the city of Pryor. A car was washed off of the road near Pryor. The occupant escaped from the car and waded out of the water and into town in sub-freezing temperatures. Ice was forming on his clothes and he was suffering from hypothermia when he reached town. No estimate on flood damage was available.</p>								
Claremore, Rogers County	31	evening			0	0	?	?	Flooding
	<p>Four inches of rainfall caused Cat Creek to flood portions of Claremore. A man and his wife along with two small children drove into the water and were washed downstream. Although freezing temperatures were occurring, there were no injuries. No significant damage occurred from the flooding.</p>								
<b>35 OREGON</b>									
Columbia Basin	12-13				0	1	3	0	Snow/Ice
	<p>Light snow had fallen in the valleys and up to a foot of snow in the hills of the Columbia Basin region, causing numerous minor traffic accidents. Pendleton and Hermiston recorded light snow and ice. Icy sidewalks proved hazardous in Hermiston where a 62 year old man was hospitalized for a hip injury after he fell while walking.</p>								
Jackson and Klamath Counties	17-18				0	0	3	0	Snow/Ice
	<p>Snow, ice and jackknifed trucks closed Interstate 5 over the Siskiyou for six hours. Snow accumulations ranged from 5 to 6 inches in Butte Falls to barely a dusting in Medford. Several pileups of vehicles were reported on Oregon 97 north of Klamath Falls.</p>								
Northwest Oregon	20				2	10	5	0	Snow/Freezing Rain
	<p>Portions of northwest Oregon received up to 4 inches of snow, while other portions received some freezing rain and snow mixed. A multitude of traffic accidents were reported throughout the area. Two persons died after the car which they were riding slid on a patch of ice and hit another car five miles east of Lebanon. A 58 year old Portland area man fell and broke his hip in the slippery conditions.</p>								
<b>36 PENNSYLVANIA, Eastern</b>									
Eastern Pennsylvania	05-06	1900-1100EST			0	0	3	0	Snow, Sleet, Freezing Rain
	<p>Snow began on the evening of the 5th but quickly changed to sleet and freezing rain across the south and to all rain overnight. The snow also became mixed with sleet over the middle Susquehanna Valley and the Northeast. Only the Northwest continued with all snow. Accumulations of snow ranged from zero at Philadelphia to an inch or two the remainder of the southeast and the Lower Susquehanna Valley, to 2 inches in the Northeast, and up to 4 inches around Williamsport and 6 inches in Tioga County. The snow and ice caused hazardous traveling conditions and resulted in numerous automobile accidents.</p>								

# STORM DATA AND UNUSUAL WEATHER PHENOMENA

DECEMBER 1964

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	

## PENNSYLVANIA, Eastern

Eastern Pennsylvania	26- 2200- 27 1100EST		0	0	3	0	Snow
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Snow, which fell heavily for several hours across the northern half of Eastern Pennsylvania and the Lehigh Valley, resulted in significant accumulations. Accumulations of 4 to 7 inches were recorded across the northern half and the Lehigh Valley. Northern Bucks County received 2 to 4 inches of snow. The remainder of Eastern Pennsylvania had only a few hours of precipitation, which included a brief period of snow. Even over the areas of the significant snowfall, the precipitation turned to freezing rain in the afternoon of the 27th. Numerous automobile accidents resulted from the slippery roadways in all areas.

36 PENNSYLVANIA, Western - NONE REPORTED

37 RHODE ISLAND - NONE REPORTED

## 38 SOUTH CAROLINA

Northwestern South Carolina	5-6 p.m.		0	0	3	0	Freezing Rain
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Freezing rain began in the higher elevations of Oconee, Pickens, Greenville and Spartanburg Counties at approximately 7:00 p.m., and continued until after midnight. Ice accumulations broke tree limbs and caused power interruptions in a few areas.

## 39 SOUTH DAKOTA

Central and Northeast	1- Late after- 2 noon- Morning		0	0	0	0	Snow
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Snow fell in the central and northeast with amounts ranging from 3-10 inches. Heaviest amounts were in the northeast with Day County reporting 8-10 inches.

West and Northcentral	21 Morning		0	0	0	0	High Wind
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Strong winds gusted to 60 mph in the west through northcentral.

Western Third	23 Morning- Afternoon		0	0	0	0	Snow
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Snow fell over the western third of state, with amounts ranging from 2-16 inches. The northwest was hit the hardest with amounts generally 4-8 inches, though Buffalo (Harding County) reported 16 inches, and Custer (Custer County) 11 inches. Several accidents were reported as a result.

40 TENNESSEE - NONE REPORTED

## 41 TEXAS, Northern

Collin, Dallas, and Ellis Counties	13 0915CST- 1045CST 0945CST	10	500	0	28	7	? Thunderstorm Winds ? Tornado (F3)
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An intense thunderstorm, embedded in a large area of light rain, produced high wind and a tornado as it moved north-northeast through the three counties. The tornado damage was confined to the Balch Springs, Mesquite, and Garland areas, with at least 28 people injured and approximately 600 homes damaged or destroyed.

The storm first struck between Reagor Springs and Ennis, where high winds destroyed a cotton gin and five other buildings on Highway 287.

Mobile homes suffered the greatest losses, with 8 being destroyed near Trumbull and 18 destroyed or damaged near Palmer. Three persons were injured in a destroyed mobile home south of Boyce.

The greatest number of injuries was just south of Ferris, when the thunderstorm destroyed 6 mobile homes and injured 8 people, one seriously.

As the storm moved north-northeastward, it produced some minor damage in Ferris before producing the tornado in southeast Dallas county.

## TEXAS, Northern

Striking first in Balch Springs, the tornado set down near Red Bud Road, just east of Peachtree Road. The track was just to the west of north as the strength of the storm increased. After removing roofs from a dozen homes and downing a 138 KV powerline, the tornado crossed a large field, then struck another group of homes. One house was levelled and several others were destroyed as was a drive-in theater.

Crossing another field into Mesquite, the tornado then inflicted the worst damage of the entire track. As it ran up Orisole Street, about 12 homes were destroyed and several people were injured. Several churches to the north were also heavily damaged, and the Mesquite High School was slightly damaged. From there, the storm decreased in strength, with only minor roof damage in the rest of Mesquite.

As the tornado entered Garland, it turned to the north-northeast. An eyewitness described it as being very thin and rope-like as it unroofed homes and a few businesses before receding into the clouds.

Proceeding to the northeast, the storm produced more wind damage in Sachse before crossing into Collin County. One mobile home was destroyed and six damaged at Lake Lavon, with no reported injuries. The last report of the storm was just south of Princeton where a mobile home was destroyed, injuring five people.

In all, the tornado damaged or destroyed nearly 600 homes and injured 28 people, one seriously. Damage estimates were placed at \$20 to \$30 million for the entire storm.

North Texas	17 Evening- 18 Morning		0	0	5	?	Flooding
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Numerous counties in North Texas experienced flooding during the late afternoon and evening hours as rains averaged near 2 inches. Rainfall during the past few days had already saturated the ground, increasing the run-off. The greatest 24 hour amount was 5.94 inches in the Sulphur Springs area.

The first reports of flooding came from Ellis County at 1745CST when creeks were already out of their banks. Shortly after, at 1900CST, Smith Road in Rockwall County was closed as 200 feet of roadway was under nearly a foot of water.

By 2100CST, flooding of numerous roads was reported in Dallas, Collin, Denton, Hunt, Hopkins, Tarrant, Ellis, and Fannin Counties. Several roads in Southern Dallas County near White Rock Lake were closed, as were some in Arlington and Fort Worth in Tarrant County.

Flooding was extensive in the Waco area by 2200CST when a weather related fatality occurred. Accumulated rainfall caused the roof of a business to collapse, with a man being killed by a falling beam.

Most of the flooding was confined to roads in the area, although 20 to 30 residences in Bellmead had up to one foot of water inside.

Several people were rescued from their vehicles in Hunt County during the event. At 2345CST, the Union Valley Fire Department rescued a man from his submerged auto. At 0130CST on the 18th, a sheriff's deputy waded 50 yards in waist-deep water to rescue a woman and child.

Ellis County	30 1000CST		0	0	?	?	Flooding
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Heavy rains produced flooding and closed the service road on Interstate 45 at Red Oak Creek.

Ellis County	31 0930CST 1000CST		0	0	5	?	Thunderstorm Winds, Flooding
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Thunderstorm winds struck the Buffalo Hills Trailer Park southwest of Midlothian on Highway 287 at 0930CST. Two mobile homes were overturned and destroyed, as were two cars.

The heavy rains that accompanied the storm created flooding in the area, with several roads under water for a short time.

Johnson County	31 0950CST		0	0	?	?	Flooding
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Heavy rains produced flooding near Lillian, with the intersection of Farm Roads 616 and 513 washed out.

Brown, Mills, and San Saba Counties	31 1000CST		0	0	5	?	Flooding
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Over 5 inches of rain had fallen in the past five days, causing a large run-off when 2.82 inches fell in 8 hours in Brownwood. Numerous roads were flooded, as were homes, apartments, and several school buildings.

By 1830CST, the highway between San Saba and Goldwithe was closed due to high water.

# STORM DATA AND UNUSUAL WEATHER PHENOMENA

DECEMBER 1984

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										
South Central Texas Southeast Texas	13	Morning				0	0	5	0	Wind
A line of thunderstorms moved rapidly east and northeast through central Texas producing very high winds. The effects of these storms within individual counties is listed separately below:										
Bexar County	13	0530CST				0	0	5	0	Wind
Thunderstorms with winds estimated 70 to 80 MPH hit the southwestern part of the county. The high winds ripped off roofing material, destroyed barns and outbuildings and blew over some fences. Many trees were damaged and uprooted. There was minor damage to homes and to power lines. Signs were also blown over. Most of the wind damage was centered along a 4 mile wide area from near loop 1604 southwest along Pearall Rd. There was other minor damage throughout the city as 13 streets were rendered as impassable and were blocked from fallen trees and limbs. Kelly AFB reported a wind gust to 50 MPH while the wind at the San Antonio International Airport gusted to 46 MPH.										
Atascosa County	13	0530CST				0	0	5	0	Wind
Thunderstorm winds destroyed a barn 2 miles west of Jourdanon.										
Hays and Caldwell Counties	13	0600CST				0	0	4	0	Wind
Thunderstorm winds swept through these two counties, damaging carpools, roofs and barns. Winds were estimated at near 80MPH in Lockhart. A roof of a barn was blown off near the town of Martindale. In Caldwell County, many small buildings and sheds were damaged, as well as roofs to residences and businesses.										
Guadalupe County	13	0615CST				0	0	5	0	Wind
Thunderstorm winds hit the Seguin area with most of the damage centered in a 10 block area on the southeast side of the city near the SH123 bypass and Hwy 90A. A 12 unit apartment complex was hardest hit where the roofing was ripped off of 6 of the units. Damage at the apartment complex was estimated at \$250,000. A 200 ft radio tower at the Guadalupe County Hospital was bent in half from the high winds. Front plate glass windows were broken out of a shopping center store. The same store had its air conditioning unit blown off its roof. A bank building nearby, suffered extensive damage to its heavily tiled roof. Most of the other damage in the shopping center was to signs. Several nearby trees were uprooted. Other damage around Seguin was to barns, garages, storage sheds and portable buildings. In the northeastern part of the county, high winds hit the Staples community where a roof was blown off of a mobile home. Wind did damage to some permanent residences also. Several 100 year old oak trees were toppled.										
Bastrop and Lee Counties	13	0705CST				0	0	5	0	Wind
Thunderstorm winds destroyed two mobile homes just west of Giddings. Also in the area, high winds blew off roofing material, collapsed patio covers and destroyed several barns. Many utility poles were blown over from the Giddings area southwest to Rosanky in Bastrop County.										
Williamson County	13	0720CST				0	0	4	0	Wind
Thunderstorm winds destroyed a barn east of Taylor on FM112. A nearby farm house had some windows broken out from the flying debris. A utility line was also downed.										
Brazos and Burlison Counties	13	0805CST				0	0	5	0	Wind
Thunderstorm winds destroyed an aircraft at Easterwood Airport. The high winds tore the aircraft loose from its moorings and rolled it several times across the parking ramp. The wandering plane hit three other aircraft before coming to rest. At Coulter Field, just outside of Bryan, winds lifted the roof from a hangar and it collapsed on the top of a Cessna aircraft. There was other damage in the Bryan area, mostly to trees, signs and roofs. One substantial barn valued at \$200,000 was destroyed. The Tex A&M Meteorology Department at College Station measured the winds at 67MPH. In Burlison County, near Deanville, a mobile home was severely damaged. The wind also uprooted trees and destroyed at least one barn and a garage.										
Madison County	13	0830CST				0	0	5	0	Wind
Thunderstorm winds uprooted trees, tore off roofs of barns and mobile homes and did damage to at least one home. Damage was reported from the communities of North Zulch, Concord, and Brush which is located between Normangee and Madisonville.										
Houston County	13	0955CST				0	0	0	0	Hail, Wind
Thunderstorm winds estimated at 55MPH and 3/4 inch hail hit the Crockett area. Damage not reported.										

— TEXAS, Southern										
Kimble County	31	Early Morning				0	?	?	0	Flash Flooding
Heavy rains up to 6 inches fell over Kimble County, producing flash flooding on the tributaries of the Llano River. A major flood developed on the Llano River from the flood waters of the North and South forks west and southwest of Junction. The river reached a height of 30 ft at Telegraph and Junction. The stage at Mason was 26 ft, and 24 ft at Llano. The heavy rains flooded creeks, draws and many low water crossings. Many roads were closed in the area. 10 persons in a hunting cabin along the river near Junction were forced from the cabin due to the high water. They escaped the high water by climbing to the top of a nearby Pecan tree where they clung to the top limbs for 8 hours before being rescued. There were other persons in the area that had to be rescued from stranded vehicles at low water crossings.										
Kerr County	31	Early Morning				3	0	?	0	Flash Flooding
Heavy rains of 5 to 6 inches occurred over the headwaters of the Guadalupe River in the western part of the county, causing flash flooding of low water crossings and the closing of several roads. A car was swept off a low water crossing 11 miles southeast of Kerrville near Center Point. Three persons were drowned as a father made a valiant attempt to save his two baby daughters. A older third daughter made it to safety. The City of Kerrville lost portions of a dam as water undermined a part of the spillway. The City estimated the damage from the flood waters would run into the hundreds of thousands of dollars, mainly in the replacement of pavement and clearing of the right of way of the roadways from the debris. The Guadalupe River crested at 13 ft at Kerrville, 21 ft at Hunt, and 15 ft at Ingram.										
Real and Uvalde Counties	31	Morning				1	1	4	?	Flash Flooding
Heavy rains of up to 9 inches on the upper watersheds of the Frio and Sabinal Rivers sent the two rivers on a rampage. The Frio River at Con Can reached a stage of 21 feet, which was the highest stage there since 1966. The Sabinal River crested at near 17 feet near Sabinal, where the Police Chief lost his life in an attempt to rescue a person from an automobile that had been washed away at a low water crossing about one mile northwest of Sabinal. Many low water crossings throughout the two counties were under water, forcing the closing of several Farm to Market roads. At least three other automobiles were swept off low water crossings with the occupants making it to safety.										
Bandera County	31	Morning				0	0	4	0	Flash Flooding
The Medina River rose to a height of 15 feet at Bandera from heavy rains of up to 6 inches in the western part of the county. Many low water crossings were flooded and a few roads were closed, but by late in the day, most of the streams had receded and traffic was back to normal. The only damage reported was to a roadside park just west of Bandera. There was cost involved in moving debris from the many flooded low water crossings.										
Milam County	31	0530CST				0	0	4	0	Wind
Thunderstorm winds hit near a farm southwest of Thronedale and did extensive damage to outbuildings and farm equipment. The high winds broke out several windows in the farm residence. A large storage building was destroyed.										
Lee County	31	0810CST				0	0	4	0	Wind
Thunderstorm winds demolished a camp house 10 miles north of Giddings. There were 9 persons inside the camp house and all 6 were treated at a nearby hospital and released. The camp house was rolled over several times. Nearby vehicles were also damaged. Law enforcement officials, investigating the incident, stated it was a wonder that no one was killed.										
Matagorda County	31	1000CST	?	?		0	0	4	0	Tornado(F1)
A small tornado hit on the edge of the small town of Sargent. The tornado destroyed 2 mobile homes and damaged 25 residences. A barn was blown into a nearby canal.										
Brazoria County	31	1000CST				0	0	4	0	Wind
Thunderstorm winds did scattered damage throughout the county. Winds gusted to 60MPH at Dow Chemical Plant at Freeport. An auto repair garage was severely damaged at Clute. In Marvel, several homes and barns were damaged. The Texaco Plant reported wind damage also. Several small buildings were overturned.										

# STORM DATA AND UNUSUAL WEATHER PHENOMENA

DECEMBER 1984

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	

## TEXAS, Southern

Harris County	31	1130CST	4	200	0	53	7	0	Tornado(F2)
<p>A tornado hopped across a four mile long section of southeast Houston known as Pasadena. Damage from the tornado was estimated in the excess of 10 million dollars. 53 persons were injured, 45 of them were treated at local hospitals. There were no deaths. Hardest hit was the southeast part of Pasadena near Red Bluff Rd. Massive property damage occurred at two apartment complexes. Bennett Estates sub-division off of Red Bluff Rd and west of the Beltway sustained major damage. According to the Red Cross, 74 apartment units, 8 houses, and two mobile homes were destroyed by the tornado. There was major damage to 336 apartment units, 23 homes and 3 mobile homes making them uninhabitable. There was minor damage to 118 apartment units, 26 homes and 6 mobile homes. The entire Palm Shadows Apartment Complex at 3600 Red Bluff Rd was condemned because of the damage. Cars were smashed and overturned. More than 7,000 homes were without electricity as 700 power lines were downed. There was other wind damage just south and southeast of the Pasadena tornado. Winds estimated at 60 MPH did damage to roofs, fences and garages. Other wind damage reports were scattered throughout the Houston area.</p>									
Harris County	31	1140CST	.5	50	0	?	5	0	Tornado(F1)
<p>A small tornado touched down briefly at La Porte, which is about 6 miles east of Pasadena. The tornado apparently was spawned by the same severe thunderstorm that produced the tornado at Pasadena. This tornado was not near as severe. The tornado did damage to 10 to 20 homes. Injuries not reported.</p>									
Chambers and Harris Counties	31	1145CST			0	0	5	0	Wind
<p>Thunderstorm winds damaged several businesses in the Baytown, Highlands area in the eastern part of Harris County. The severe thunderstorm that hit the area could have been the same thunderstorm that spawned the tornadoes at Pasadena and La Porte. A fire-works trailer was destroyed by the high winds. A nearby automobile dealer lost his front plate glass windows out of his showroom. A large sign in front of the building was also blown over. Other businesses in the area reported minor damage to doors and windows. 6 portable buildings were rolled, and two of them were destroyed.</p> <p>There was also wind damage reported along I-10, northeast of Baytown in Chambers County.</p>									
Jefferson County	31	1200CST			0	0	4	0	Wind
<p>Thunderstorms produced high winds that severely damaged a home in the town of Fannett. The wind also damaged car ports, utility lines and downed several large trees.</p>									
Harris County	31	1235CST			0	0	?	0	Hail
<p>One inch hail was reported over the southwestern part of the City of Houston. Damage not reported.</p>									
Hays County	31	1830CST			0	0	4	0	Wind
<p>Thunderstorm winds hit an area just east of San Marcos where a DPS spokesman said the roofs of two houses were ripped off, trees were uprooted, and several storage buildings were destroyed. Two trailers lost their awnings.</p>									

## 41 TEXAS, Western ————— NONE REPORTED

## 42 UTAH

State Wide	16	0000 to 2400MST			0	0	1	0	Heavy Snow
<p>A major winter storm dumped over two feet of snow in spots. Alta and Snowbird ski resorts received 27 and 24 inches, respectively during the storm. Park City and Brian Head resorts received 20 inches each, Hill Field Air Force Base 12 inches, and Hooper 11 inches. Ogden and Utah Valleys recorded 8 to 10 inches and Monticello 6 to 8 inches. Strong southerly winds with the storm produced snow rollers in West Valley City. At one point a Utah Highway Patrolman reported that the visibility was so low that he could not find Sardine Canyon.</p>									
State Wide	19 & 20	19/0600 to 20/1700MST			0	0	1	0	Heavy Snow
<p>A winter storm left 4 to 6 inches in most valley locations across the state and much more in the southwest. Enterprise, Utah reported a storm total of 17 inches. Vernal received 8 inches, Manti 9 inches, and Fillmore, Monroe, and Milford all received 12 inches. Mountain reports included 13 inches at Brian Head, 14 inches at Mt. Carmel north of Kanab, 14 inches at Snowbird, and 15 inches at Alta.</p>									

## UTAH

Kane, San Juan, Uintah, and Washington Counties	27	0000 to 2400MST			0	0	1	0	Heavy Snow
<p>A wet winter storm left heavy snow and rain in eastern and southern portions of the state. The heaviest snowfall was 12 inches at Vernal. Other valley snowfall amounts ranged from 3 to 6 inches. Mountain storm totals included 9 inches at Park City and 14 inches at Sundance Ski Resort. A brief period of freezing rain occurred in Beaver County around midday. Rainfall totals included 1.55 inches at Monticello, 1.50 inches at Blanding, .98 inches at Alton, .91 inches at Hurricane, .71 inches at St George, .68 inches at Moab, and .62 inches at Bullfrog.</p>									

## 43 VERMONT

Statewide	05	PM			0	0	?	0	Snow Storm
<p>Winter's first big storm hit Vermont late Wednesday evening and into Thursday morning. Hardest hit was Chittenden County, where nearly a foot of snow fell. Blowing winds (25 mph) at Burlington caused considerable drifting. Light freezing rain fell toward the end of the storm in southern parts of Vermont, but caused no damage.</p>									

## 44 VIRGINIA ————— NONE REPORTED

## 45 WASHINGTON ————— NONE REPORTED

## 46 WEST VIRGINIA ————— NONE REPORTED

## 47 WISCONSIN

West Central through Northern portions	01-Evening hours into 02-Evening hours				0	0	?	0	Snowstorm
<p>The first significant snowstorm of the Winter Season dumped a band of 4 to 10 inches of snow from West Central to North Central Wisconsin. Pearson in Langlade county picked up 10 inches.</p>									
Northwest & Northern portions	21				0	0	?	0	Snowstorm
<p>A band of 4 to 10 inches of snow was deposited across Northwest and Northern Wisconsin. Phillips in Price county received 10 inches.</p>									
Southern & Southeast portions	26				0	0	?	0	Snowstorm
<p>4 to 9 inches of snow fell over Southern and Southeast Wisconsin. Cambridge in Dane county noted 9 inches. Most of the snow did not last for long. Record breaking warmth with temperatures in the 50s and 60s melted almost all of the snow on the 26th.</p>									
Southern & Eastern portions, Lake Superior Snow-Belt region	31-Afternoon hours into 01-Morning hours				0	0	?	0	Snowstorm
<p>From 4 to 12 inches of snow fell south and east of a line from Crawford county in the southwest to Marinette county in the northeast...with 8 to 12 inches being reported southeast of a line from Ozaukee county in the southeast to Lafayette county in the southwest. Considerable blowing and drifting snow blocked many county roads and caused drifts up to 4 feet in Racine, Kenosha, and Walworth counties. The northern tier of counties bordering Lake Superior picked up 1 to 4 inches of snow with amounts locally up to a foot in extreme northern Bayfield and Ashland counties.</p>									

# STORM DATA AND UNUSUAL WEATHER PHENOMENA

DECEMBER 1984

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS		ESTIMATED <sup>1</sup> DAMAGE		CHARACTER OF STORM	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							KILLED	INJURED	PROPERTY	CROPS	
<b>48 WYOMING</b>																			
Park and Fremont Counties	23	Morning			0	0	?	0	High Wind										
	Winds gusting to 60 mph were logged along the east slopes of the Absaroka and Wind River Mountains of Park and Fremont Counties, respectively.																		
Southeast	23	Day			0	0	4	0	High Wind										
	Winds gusting to 65 mph were logged in Carbon, Albany and Laramie Counties of the southeast. Several semi trailer trucks were blown off roads. A large sign over a car dealership was blown onto cars in Cheyenne, Laramie County.																		
<b>49 ALASKA, Northern</b> ————— NO REPORT RECEIVED																			
<b>49 ALASKA, Southern</b> ————— NO REPORT RECEIVED																			
<b>49 ALASKA, Southeastern</b> ——— NONE REPORTED																			
<b>50 HAWAII</b>																			
All Islands	24-25				0	0	5	4	Wind, Flash Flooding										
	A Kona storm developed northwest of the Islands over the Christmas holidays. Minor wind and flash flooding damage occurred on all of the islands.																		
<b>51 PUERTO RICO</b> ————— NONE REPORTED																			
<b>52 VIRGIN ISLANDS</b> ————— NONE REPORTED																			
<b>53 PACIFIC</b> ————— NONE REPORTED																			

# STORM SUMMARY

DECEMBER 1984

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		
								PROP. ERTY	CROPS			PROP. ERTY	CROPS			PROP. ERTY	CROPS			PROP. ERTY	CROPS			PROP. ERTY	CROPS	
Alabama																										
Arizona																										
Arkansas																										
California									2	23	?	?		?		1										?
Colorado										1	5						?									
Connecticut																										
Delaware																										
Florida																										
Georgia																										
Idaho																										
Illinois																										
Indiana																										
Iowa																										
Kansas																										
Kentucky																										
Louisiana																										
Maine																										
Maryland & DC																										
Massachusetts																										
Michigan																										
Minnesota																										
Mississippi																										
Missouri																										
Montana																										
Nebraska																										
Nevada																										
New Hampshire																										
New Jersey																										
New Mexico																										
New York																										
North Carolina																										
North Dakota																										
Ohio																										
Oklahoma																										
Oregon																										
Pennsylvania																										
Rhode Island																										
South Carolina																										
South Dakota																										
Tennessee																										
Texas	4	2				8	1	7																		
Utah																										
Vermont																										
Virginia																										
Washington																										
West Virginia																										
Wisconsin																										
Wyoming																										
Alaska																										
Hawaii																										
Pacific																										
Puerto Rico																										
Virgin Islands																										

# GENERAL SUMMARY OF TORNAOES, 1984

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

The 1984 tornado season began on January 13th at 6:19 p.m., when a small tornado briefly touched down in Huntington Beach, California, ripping off a porch from a mobile home. At 11:40 a.m., on New Year's Eve, the final twister of the season touched down in La Porte, Texas, with minor damage confined to 20 homes. In the United States, 907 tornadoes were reported on 166 days, killing 122 people and injuring 2,488 others. Thirty-two of these storms were classified as killer tornadoes. Property damage was estimated to be in excess of one billion dollars. During 1984 tornadoes damaged or destroyed approximately 840 mobile homes, causing 43 deaths and injuries to 234 people. Six states did not record a tornado: Alaska, Hawaii, New Jersey, Rhode Island, Vermont and West Virginia.

Location of killer tornadoes, state to state border crossings, and new monthly records since 1953 by state or nation are shown in the following tables:

## LOCATION OF KILLER TORNAOES

<u>DATE</u>	<u>STATE</u>	<u>COUNTY</u>	<u>TOTAL DEATHS</u>
March 15	Arkansas	Cleburne	2
March 15	Arkansas	Poinsett	5
March 28	North Carolina*	Robeson	2
March 28	North Carolina	Cumberland	2
		Sampson	10
March 28	North Carolina	Sampson	1
		Wayne	2
March 28	North Carolina	Greene	7
		Pitt	9
March 28	North Carolina	Bertie	6
March 28	North Carolina	Gates	2
March 28	North Carolina	Perquimans	1
March 28	South Carolina	Newberry	1
March 28	South Carolina	Fairfield	5
March 28	South Carolina	Marlboro	7
March 28	South Carolina*	Marlboro	2
*Same tornado crossed state boundary.			
April 20	Oklahoma	Blaine	1
April 21	Mississippi	Leflore	2
		Tallahatchie	5
		Yalobusha	7
		Union	1
April 26	Minnesota	Hennepin	1
April 26	Oklahoma	Pawnee	3
April 26	Oklahoma	Okmulgee	8
April 27	Illinois	Will	1
April 27	Wisconsin	Vilas	1
April 27	Wisconsin	Waukesha	1
April 27	Wisconsin	Winnebago	1
April 29	Oklahoma	Creek	1
May 3	Alabama	Montgomery	5
May 8	Maryland	Dorchester	1
June 5	Texas	Tom Green	1
June 7	Iowa*	Keokuk	2
June 7	Iowa	Ringgold	1
June 7	Missouri*	Harrison	1
June 7	Wisconsin	Iowa	9

\*Same tornado crossed state boundary.

# GENERAL SUMMARY OF TORNADES

October 16	Tennessee	Carroll	1
October 18	Missouri	Shannon	1
October 18	Texas	Titus	1
October 31	Kansas	Osage	1
November 9	Missouri	Washington	1

## STATE TO STATE BORDER CROSSINGS

<u>DATE</u>	<u>STATE</u>		<u>STATE</u>
March 28 (3 tornadoes)	South Carolina	into	North Carolina
May 3	South Carolina	into	North Carolina
May 8 (2 tornadoes)	Maryland	into	Delaware
June 7	Missouri	into	Iowa
June 17	Nebraska	into	Iowa

## NEW MONTHLY RECORDS (SINCE 1953)

<u>MONTH</u>	<u>STATE OR NATION</u>	<u>NEW RECORD</u>	<u>PREVIOUS RECORD (Year)</u>
March	North Carolina	14	8 (1975)
March	South Carolina	12	4 (1974)
April	Wisconsin	11	6 (1974)
May	Alabama	20	16 (1973)
May	Delaware	2	-0-
May	Georgia	16	10 (1980)
May	Maryland	5	2 (1974)
May	Tennessee	24	14 (1973)
May	Virginia	5	3 (1976)
June	United States	242	224 (1973)
June	Iowa	48	18 (1979)
June	Nebraska	36	35 (1975)
June	Wyoming	16	14 (1982)
August	Utah	5	3 (1968)
October	Idaho	1	-0-
October	Missouri	10	9 (1966)
November	Missouri	9	6 (1958)

The first killer tornado of the 1984 season occurred on March 15th at 5:40 p.m., when it touched down 4 miles (6.4 km) southeast of Clinton, Arkansas and traveled 48 miles (77.2 km) east to one mile (1.6 km) northeast of Huff, Arkansas. One woman was killed in her home 3 miles (4.8 km) east of the city Greers Ferry. Three fishermen were in a boat on Greers Ferry Lake when the boat was capsized. Two of the occupants made their way to safety and the body of the third person was never found. Thirteen people were injured as a result of the tornado. The tornado also destroyed the bridge which spanned Greers Ferry Lake. The bridge was 1,320 feet (402 m) long with a large steel superstructure. Sixty-three homes, 22 mobile homes, and seven businesses were destroyed. Ninety-nine homes, eight mobile homes, two businesses, and 15 farm buildings were damaged. On the same day, another killer tornado touched down in Arkansas at 7:17 p.m., one mile (1.6 km) north of Shoffner and traveled east to one mile (1.6 km) north of Fisher. The track was about 1,320 feet (402 m) wide at initial touch down. It then widened to one mile (1.6 km) while turning northeast just before entering Fisher. Five fatalities were reported and 12 people were injured. The tornado destroyed 18 homes, three businesses, a post office, the town hall, and ten mobile homes. Heavy damage was done to 25 other homes and five businesses.

# GENERAL SUMMARY OF TORNADOES

On March 28th, an intense low pressure system moved across North and South Carolina spawning 22 tornadoes. This was the deadliest tornado outbreak in 60 years for the Carolinas, and the deadliest nationally for the 1984 season. The first tornado touched down at 4:30 p.m., near Ware Shoals, South Carolina. At 4:40 p.m., another tornado touched down six miles (9.7 km) west and moved to 10 miles (16.1 km) northeast of Laurens, South Carolina. Thirty-two mobile homes and five community buildings were damaged or destroyed. Five hundred acres of timber were destroyed. The third twister touched down 10 miles (16.1 km) north of Monroe, North Carolina, causing minor damage. The first fatality of the outbreak occurred about 5:30 p.m., when a tornado touched down 6 miles (9.7 km) southwest of Newberry, South Carolina, and moved northeast through the city causing major damage. The fifth tornado touched down near New Hope and moved 19 miles (30.6 km) east into Fairfield County, South Carolina. For the Newberry and New Hope tornadoes, 254 homes, 45 mobile homes, 86 businesses, 68 farm buildings and seven public buildings were damaged or destroyed. A tornado developed five miles (8 km) west of Winnsboro, South Carolina, moved through northern Winnsboro into Fairfield County, crossed Wateree Lake and dissipated in the western tip of Kershaw County. Five people were killed, all of them in mobile homes, and 49 people were injured. Seven miles (11.3 km) north of McBee, South Carolina a small tornado cut a two mile (3.2 km) path of destruction through a pine forest. At 6:45 p.m., a severe tornado caused extensive damage from 1.5 miles (2.4 km) west of Cash, South Carolina to seven miles (11.3 km) northeast of Cash. Damage included four homes, two businesses and 36 farm buildings damaged or destroyed. A tornado touched down at 7:10 p.m., and moved from five miles (8 km) west-northwest of Bennettsville, South Carolina and moved across the Northwood Shopping Center of Bennettsville and into North Carolina for a total distance of 16 miles (25.7 km). In South Carolina seven people were killed and 100 others injured. Damage exceeded 5 million dollars. A tornado touched down west of Tatum, South Carolina at 7:20 p.m., and traveled seven miles (11.3 km) in South Carolina, killing two people and injuring 115 others prior to entering North Carolina. The twister traveled an additional 38 miles (61.1 km) in North Carolina, creating havoc in Maxton and Red Springs, killing two people and injuring 280. This tornado traveled in tandem with the Bennettsville tornado for about 10 miles (16.1 km). The width of the tornado was 2.5 miles (4 km) at its widest point. A severe tornado touched down five miles (8 km) northeast of Tobemory, North Carolina and traveled northeast at 60 mph (96.5 km/h) through Beaver Dam, Salemburg, Roseboro and Clinton, North Carolina. Twelve people were killed and 101 people were injured. At 8:10 p.m., a small tornado touched down west of Rocky Mount, North Carolina causing minor damage. A tornado developed five miles (8 km) northeast of Clinton, North Carolina and traveled northeast causing considerable damage in the towns of Faison, Calypso, and Mount Olive. Three people were killed and 149 were injured. Another twister touched down in extreme southeast Wayne County, North Carolina and traveled northeast into Lenoir County causing extensive damage. Eighty-one people were injured. At 8:45 p.m., a killer tornado touched down in northeast La Grange, North Carolina and left a 38 mile (61.1 km) path of destruction 1,223 yards (1,118 m) wide to just east of Greenville, North Carolina. The tornado generated winds estimated at 207-260 mph (333 to 418 km/h). This tornado killed 16 people, the largest death toll for any tornado during the outbreak. A tornado touched down west of Lewiston, North Carolina and moved northeast destroying a mobile home park, where six people were killed. Shortly after 9:00 p.m., two tornadoes were reported, one near Ahoskie, and the other near Harrellsville, North Carolina. At 9:30 p.m., a twister set down in western Gates County, North Carolina and traveled 14 miles (22.5 km) northeast across the county. Nine homes and seven mobile homes were destroyed and 39 homes were damaged. Two people lost their lives and 10 were injured. At 9:35 p.m., a tornado touched down near Loris, South Carolina and moved northeast across the state boundary to near Tabor City, North Carolina. Total path length in both states was nine miles (14.5 km). The final twister of the outbreak began as a waterspout over Albermarle Sound and moved onshore in southern Chowan County, North Carolina and crossed into Perquimans County, where one person was killed and another injured when a tree fell on, and demolished their mobile home. In summarization, the outbreak lasted six hours, spawned 22 tornadoes, and caused 57 deaths (of which near 42% occurred in mobile homes) and 1,248 injuries.

A powerful tornado touched down on April 21st, at 4:00 p.m., three miles (4.8 km) west of Schlater, Mississippi. The tornado moved northeast at about 45 mph (72.4 km/h), to New Albany, Mississippi. The twister was on the ground for about 110 miles (177 km): Two hundred and forty nine homes, 25 mobile homes, 22 businesses and one church were either destroyed or damaged. Fifteen people were killed and 76 others were injured. Lafayette, Leflore, Tallahatchie and Yalobusha counties were declared a Federal Disaster Area.

On April 26th and 27th, severe thunderstorms spawned 47 tornadoes in the following 10 states: Iowa (3), Illinois (4), Kansas (10), Louisiana (1), Michigan (1), Minnesota (3), Missouri (2), Oklahoma (11), South Dakota (1), and Wisconsin (11). As a result of these tornadoes 16 people were killed: Illinois and Minnesota each recorded one fatality, 11 were killed in Oklahoma and three in Wisconsin. Two hundred and fifty-nine people were injured.

On May 3rd, five people were killed and 37 injured in Montgomery, Alabama, by a violent tornado which touched down and moved rapidly over the northern portion of Montgomery and into eastern Elmore

# GENERAL SUMMARY OF TORNADES

County. Four of the deaths occurred as the twister swept across the northern bypass road and overturned 25 cars and two trucks. Some of the victims were thrown from their automobiles and a few cars were blown 100 yards (91.4 km) from the highway. After crossing the bypass, the twister moved into a mobile home park and destroyed nine mobile homes and killed one of the occupants. Property damaged or destroyed included: 213 homes, nine mobile homes, 24 businesses, 25 automobiles and two trucks.

On May 8th, new tornado records for May were established in Delaware (2) and Maryland (5). One death was recorded and 18 people were injured in Maryland. Delaware reported 10 injuries.

On May 12th, a tornado touched down seven miles (11.3 km) northwest of Garden City, South Dakota and traveled 25 miles (40.2 km) east southeast through Henry, to just one mile north of Grover, South Dakota. Seven farms were devastated and 15 other farmsteads sustained major damage. The tornado hit the southwest section of Henry and split into two tornadoes. One tornado moved to the northeast for a short distance causing no damage; the other twister continued on a southeast course leaving a path of destruction to just north of Grover. Hail, from three quarters of an inch (1.91 cm) to four inches (10.16 cm) deep was common in or near the path of the tornado. In Henry, hail accumulated to 15 inches (38.1 cm) deep. No casualties or injuries were reported.

A record 242 tornadoes were reported in the United States during June 1984. Iowa reported 48 tornadoes, breaking their previous June record by an almost threefold number.

At 5:45 p.m. on June 7th, a tornado touched down just southwest of Eagleville, Missouri and moved 10 miles (16.1 km) northeast through Harrison County. The tornado killed a man and injured his wife as it destroyed their mobile home. The storm caused extensive damage to farmsteads in Harrison County before entering Iowa. In Iowa the destructive tornado continued on a northeast course for 117 miles (188.3 km) to near South English, Iowa. The total path length of 127 miles (204.3 km) was the longest of the 1984 season. Eight businesses, one church, 212 homes, and 700 farm buildings were either destroyed or badly damaged, and all types of farm machinery and equipment were destroyed. Estimated total damage exceeded 28 million dollars. Two people were killed while driving their car. The automobile was lifted and deposited 300 yards (274.3 m) from the highway and both occupants were thrown from the car. The tornado split in two near South English; the main tornado continued its northeast course and the second tornado veered east before turning northeast and traveled 24 miles (38.6 km) through Washington and Johnson Counties, Iowa. Extensive damage was reported in rural areas and one person was injured. On the same day at 11:41 p.m., a killer tornado touched down south of Ridgeway, Wisconsin. The twister slammed into Barneveld tearing up the village. Ninety-three homes were destroyed, 64 damaged, and 17 businesses and public buildings were leveled. Nine people were killed and 197 injured. The tornado continued moving northeast ripping up 24 homes before reaching Black Earth, Wisconsin. There it destroyed or damaged 24 more homes and numerous farm buildings, and injured three people. The tornado continued moving northeast to Lodi, Wisconsin, damaging five homes and uprooting numerous trees along the way. In Lodi, it demolished two barns and several sheds before dissipating. Total damage exceeded \$40 million.

Tornado activity took a sharp decrease in July and continued decreasing through December, with the exception of a slight rise in activity during October. During this period 220 tornadoes were recorded, resulting in five fatalities. Four deaths were reported in October and one fatality in November.

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 1950-1984. 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, 1984

STATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	ANN
<b>ALABAMA</b>													
Number		1	7	5	20	1	1		1	1	5		42
Days		1	4	2	3	1	1		1	1	1		15
Deaths					5								5
Injuries			18		42								60
<b>ARIZONA</b>													
Number							3	1					4
Days							2	1					3
Deaths													0
Injuries													0
<b>ARKANSAS</b>													
Number			4	6	4	1	1			4	3		23
Days			2	3	2	1	1			2	2		13
Deaths			7										7
Injuries			29	3	8					3	1		44
<b>CALIFORNIA</b>													
Number	1				1								2
Days	1				1								2
Deaths													0
Injuries													0
<b>COLORADO</b>													
Number				3	9	17	5	6					41
Days				2	3	7	3	3	1				19
Deaths													0
Injuries													0
<b>CONNECTICUT</b>													
Number							1						1
Days							1						1
Deaths													0
Injuries													0
<b>DELAWARE</b>													
Number					2		1						3
Days					1		1						2
Deaths													0
Injuries					10								10
<b>FLORIDA</b>													
Number		4	3	6	3	3	6	3	1		1		30
Days		1	3	3	2	3	6	2	1		1		22
Deaths													0
Injuries		3					1						4
<b>GEORGIA</b>													
Number		2	6	7	16		2		1	1	1		36
Days		1	2	3	2		2		1	1	1		13
Deaths													0
Injuries			1	2	34						8		45
<b>IDAHO</b>													
Number			1		1			1		1			4
Days			1		1			1		1			4
Deaths													0
Injuries													0
<b>ILLINOIS</b>													
Number			2	19	2	4		1			6		34
Days			2	4	1	2		1			2		12
Deaths				1									1
Injuries				9							11		20
<b>INDIANA</b>													
Number						2	2						4
Days						2	2						4
Deaths													0
Injuries							3						3

## TORNADO SUMMARY, 1984

STATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	ANN
<b>IOWA</b>													
Number				5	1	48	4		1	2			61
Days				3	1	8	3		1	2			18
Deaths						3							3
Injuries				5		93				2			100
<b>KANSAS</b>													
Number		3	2	29	2	20		1		6			63
Days		1	2	4	1	10		1		3			22
Deaths										1			1
Injuries		1		15		5				1			22
<b>KENTUCKY</b>													
Number			1		3	1	4		2				11
Days			1		1	1	2		1				6
Deaths													0
Injuries					9								9
<b>LOUISIANA</b>													
Number		2	6	3	11	1	1	1	2	1	1		29
Days		1	3	2	6	1	1	1	2	1	1		19
Deaths													0
Injuries		2			13	3				3	5		26
<b>MAINE</b>													
Number					1								1
Days					1								1
Deaths													0
Injuries													0
<b>MARYLAND</b>													
Number					5								5
Days					1								1
Deaths					1								1
Injuries					18								18
<b>MASSACHUSETTS</b>													
Number							3						3
Days							2						2
Deaths													0
Injuries													0
<b>MICHIGAN</b>													
Number				1	4	3	3	9	2				22
Days				1	2	3	2	4	2				14
Deaths													0
Injuries					1	2	1	4	3				11
<b>MINNESOTA</b>													
Number				3		13	6	5					27
Days				1		3	4	2					10
Deaths				1									1
Injuries				52		19							71
<b>MISSISSIPPI</b>													
Number				8	3					5			16
Days				3	2					3			8
Deaths				15									15
Injuries				84	13					6			103
<b>MISSOURI</b>													
Number			1	13		7				10	9		40
Days			1	4		2				2	1		10
Deaths						1				1	1		3
Injuries				10		2				6	15		33
<b>MONTANA</b>													
Number						5							5
Days						3							3
Deaths													0
Injuries													0

## TORNADO SUMMARY, 1984

STATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	ANN
NEBRASKA													
Number				4	6	36	4						50
Days				1	3	10	3						17
Deaths													0
Injuries				19		5							24
NEVADA													
Number							1	1					2
Days							1	1					2
Deaths													0
Injuries													0
NEW HAMPSHIRE													
Number							3						3
Days							1						1
Deaths													0
Injuries													0
NEW MEXICO													
Number							1						1
Days							1						1
Deaths													0
Injuries													0
NEW YORK													
Number					3		3						6
Days					1		1						2
Deaths													0
Injuries					1								1
NORTH CAROLINA													
Number			14	5	3	1			1				24
Days			1	3	3	1			1				9
Deaths			42										42
Injuries			801	4									805
NORTH DAKOTA													
Number					2	7	3	3					15
Days					1	5	2	2					10
Deaths													0
Injuries													0
OHIO													
Number						1		1					2
Days						1		1					2
Deaths													0
Injuries													0
OKLAHOMA													
Number			6	23	9	3			2	6	1		50
Days			2	4	3	2			1	3	1		16
Deaths				13									13
Injuries				214									214
OREGON													
Number				1	1					1	1		4
Days				1	1					1	1		4
Deaths													0
Injuries													0
PENNSYLVANIA													
Number				1			6	1					8
Days				1			2	1					4
Deaths													0
Injuries							14						14
SOUTH CAROLINA													
Number		2	12		4								18
Days		1	2		1								4
Deaths			15										15
Injuries			447										447

## TORNADO SUMMARY, 1984

STATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	ANN
<b>SOUTH DAKOTA</b>													
Number				1	6	20	3	2					32
Days				1	2	8	2	2					15
Deaths													0
Injuries						2							2
<b>TENNESSEE</b>													
Number			1	3	24		1			2	2		33
Days			1	2	3		1			2	2		11
Deaths										1			1
Injuries				3	38					2	3		46
<b>TEXAS</b>													
Number		13	9	18	19	19		4	1	6		4	93
Days		3	4	5	7	8		4	1	5		2	39
Deaths						1				1			2
Injuries		6	1		2	1				2		81	93
<b>UTAH</b>													
Number								5	1				6
Days								4	1				5
Deaths													0
Injuries													0
<b>VIRGINIA</b>													
Number			1		5								6
Days			1		2								3
Deaths													0
Injuries					15								15
<b>WASHINGTON</b>													
Number				1						1			2
Days				1						1			2
Deaths													0
Injuries													0
<b>WISCONSIN</b>													
Number				11		15	4	1	1	2			34
Days				2		6	3	1	1	1			14
Deaths				3		9							12
Injuries				42		202				3			247
<b>WYOMING</b>													
Number					2	16		1					19
Days					2	5		1					8
Deaths													0
Injuries						1							1
<b>UNITED STATES</b>													
Number	1	27	73*	176	169*	242*	72	47	17	49	30	4	907*
Days†	1	4	15	22	27	25	21	20	12	12	5	2	166
Deaths	0	0	64	33	6	14	0	0	0	4	1	0	122
Injuries	0	12	1297	462	204	335	19	4	3	28	43	81	2,488

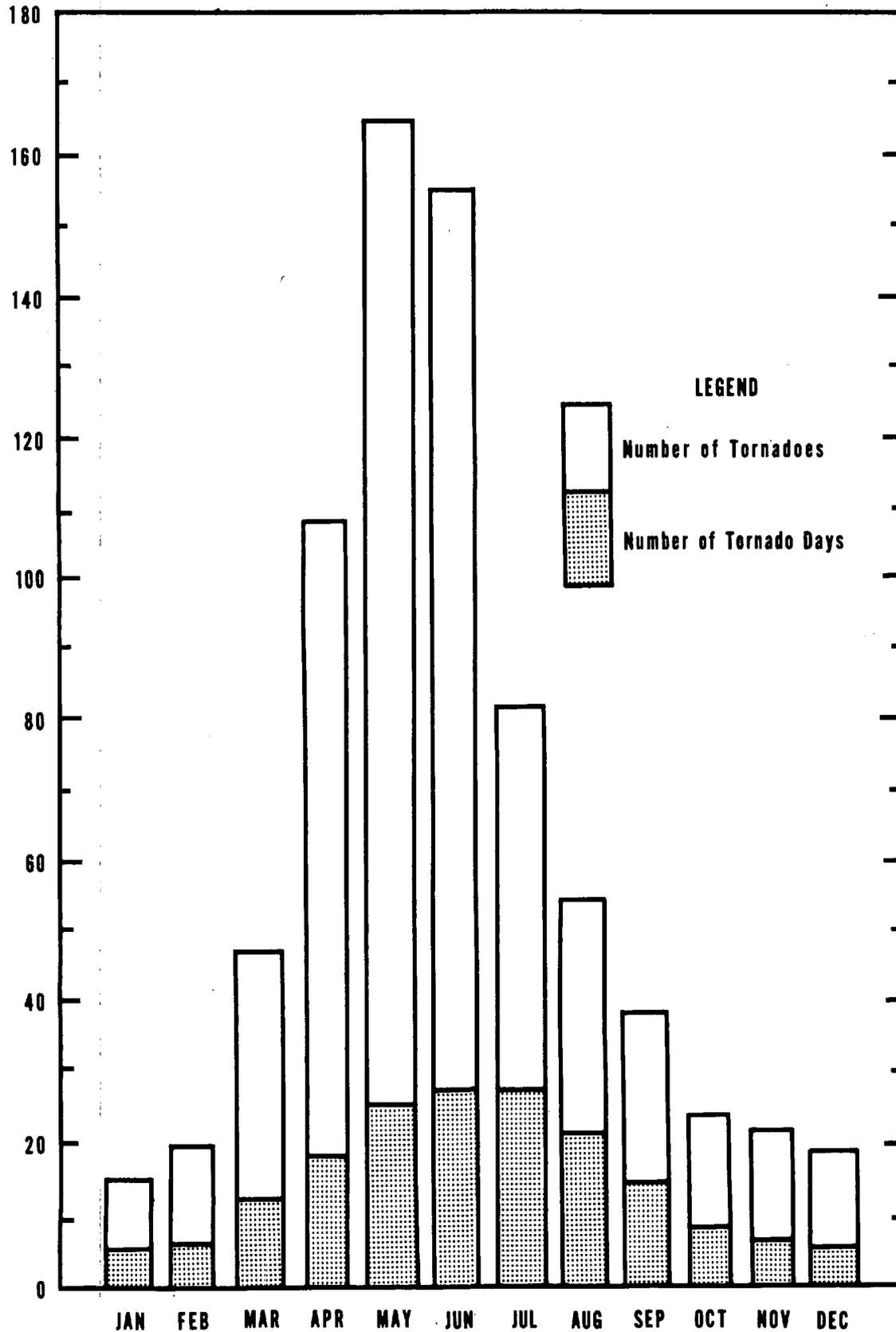
\*Corrected for boundary-crossing tornadoes.

†Tornado days for country as a whole.



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

(BASED ON 24,026 TORNADOES THAT OCCURRED FROM 1953-1984)



## NUMBER OF TORNADES, TORNADE DAYS, AND DEATHS BY STATES, 1953-84

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	686	21	45	1983+	5	1956	4.15	368	12	212	7	41
ALASKA	1	0	1	1959	0	1984+	.00	1	0	0	0	0
ARIZONA	113	4	17	1972	0	1965+	.31	93	3	3	0	0
ARKANSAS	698	22	78	1982	2	1969+	4.11	312	10	148	5	28
CALIFORNIA	124	4	14	1982	0	1968+	.24	90	3	0	0	0
COLORADO	616	19	58	1982	1	1959	1.85	381	12	2	0	0
CONNECTICUT	44	1	8	1973	0	1981+	2.75	40	1	4	0	8
DELAWARE	30	1	5	1975	0	1982+	4.56	27	1	2	0	10
DISTRICT OF COLUMBIA	0	0	0		0	1984+	.00	0	0	0	0	0
FLORIDA	1400	44	97	1975	10	1956	7.47	893	28	59	2	10
GEORGIA	679	21	46	1971+	7	1960	3.60	381	12	72	2	12
HAWAII	21	1	4	1971	0	1984+	1.02	17	1	0	0	0
IDAHO	46	1	5	1967+	0	1977+	.17	38	1	0	0	0
ILLINOIS	866	27	107	1974	4	1953	4.80	398	12	146	5	26
INDIANA	662	21	48	1973	4	1982	5.70	324	10	205	6	56
IOWA	921	29	61	1984	7	1956	5.11	414	13	57	2	10
KANSAS	1403	44	97	1955	14	1976	5.33	651	20	168	5	20
KENTUCKY	260	8	34	1974	0	1953	2.01	152	5	101	3	25
LOUISIANA	699	22	64	1983	3	1955	4.50	428	13	93	3	19
MAINE	72	2	11	1971	0	1983+	.68	64	2	1	0	0
MARYLAND	88	3	10	1975	0	1970+	2.60	68	2	2	0	2
MASSACHUSETTS	113	4	12	1958	0	1982+	4.28	82	3	99	3	120
MICHIGAN	508	16	39	1974	2	1959	2.73	294	9	233	7	40
MINNESOTA	571	18	41	1981	5	1972	2.12	320	10	76	2	9
MISSISSIPPI	674	21	44	1973	1	1979	4.41	361	11	335	10	70
MISSOURI	930	29	79	1973	6	1953	4.17	407	13	131	4	19
MONTANA	129	4	13	1978	0	1974+	.27	98	3	1	0	0
NEBRASKA	1103	34	78	1975	10	1966	4.46	540	17	49	2	6
NEVADA	22	1	4	1964	0	1981+	.06	21	1	0	0	0
NEW HAMPSHIRE	64	2	9	1963	0	1983+	2.15	56	2	0	0	0
NEW JERSEY	49	2	8	1973	0	1984+	1.95	41	1	0	0	0
NEW MEXICO	251	8	18	1972	0	1953	.64	193	6	3	0	0
NEW YORK	120	4	8	1983+	0	1953	.76	95	3	5	0	1
NORTH CAROLINA	390	12	38	1973	2	1970	2.31	243	8	67	2	13
NORTH DAKOTA	546	17	52	1976	2	1961	2.41	314	10	21	1	3
OHIO	448	14	43	1973	3	1966+	3.40	239	7	153	5	37
OKLAHOMA	1796	56	107	1957	21	1978	8.03	728	23	199	6	28
OREGON	31	1	4	1984	0	1982+	.10	27	1	0	0	0
PACIFIC	2	0	1	1981+	0	1984+	--	2	0	0	0	0
PENNSYLVANIA	263	8	23	1976	0	1959	1.81	183	6	8	0	2
PUERTO RICO	9	0	2	1979+	0	1984+	.82	8	0	0	0	0
RHODE ISLAND	1	0	1	1972	0	1984+	.26	1	0	0	0	0
SOUTH CAROLINA	303	9	23	1973	1	1970+	3.05	201	6	39	1	13
SOUTH DAKOTA	793	25	64	1965	1	1958	3.22	390	12	8	0	1
TENNESSEE	370	12	44	1974	1	1962	2.74	197	6	75	2	18
TEXAS	4002	125	232	1967	32	1953	4.68	1585	50	395	12	15
UTAH	43	1	6	1984	0	1983+	.16	35	1	0	0	0
VERMONT	26	1	5	1962	0	1984+	.85	23	1	0	0	0
VIRGINIA	184	6	22	1975	1	1982+	1.41	125	4	16	1	4
VIRGIN ISLANDS	2	0	1	1979+	0	1984+	--	2	0	0	0	0
WASHINGTON	42	1	4	1983+	0	1977+	.19	35	1	6	10	1
WEST VIRGINIA	65	2	6	1980+	0	1984+	.84	50	2	2	0	1
WISCONSIN	616	19	43	1980	3	1953	3.43	328	10	71	2	13
WYOMING	296	9	42	1979	0	1970	.94	201	6	2	0	0
TOTAL: UNITED STATES	24026*	751	1102	1973	421	1953	2.08	5450+	170	3269	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, TORNADO DAYS, DEATHS, AND RESULTING LOSSES BY YEARS, 1916-84**

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	184	34	3	9	211	85	10
1984	907	166	122	16	9	193	90	35
Means: 1953- 1984	751	170	102	---	---	123	35	7

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

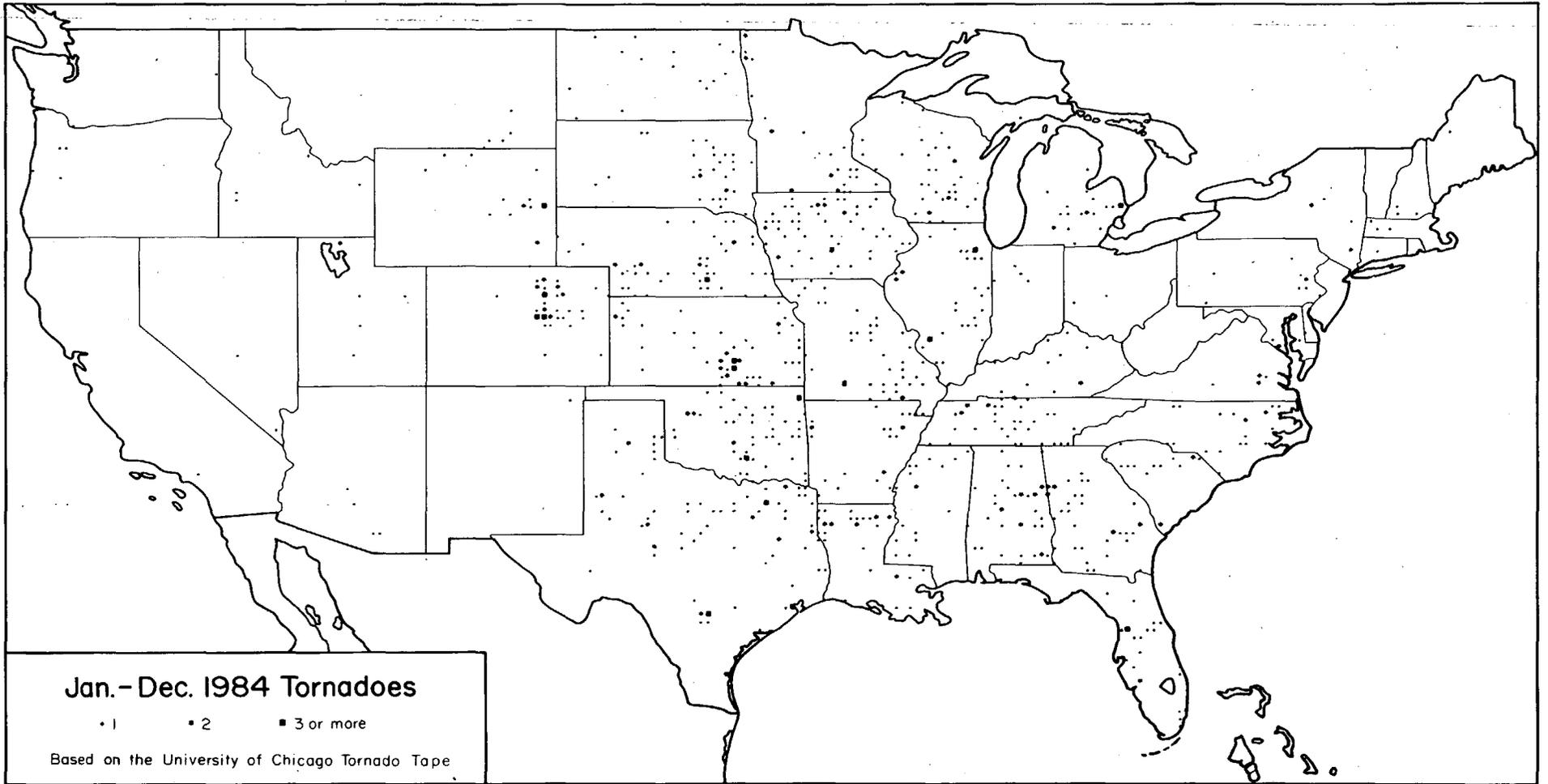
†Storm damages in categories:

- 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, 1984

STATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	ANN
ALABAMA			9	2	23		4	1	1		2		42
ALASKA													0
ARIZONA				3			1	8					12
ARKANSAS		1	3	10	21			6	4	4	7		56
CALIFORNIA			2		1								3
COLORADO					3								3
CONNECTICUT													0
DELAWARE													0
DISTRICT OF COLUMBIA													0
FLORIDA													0
GEORGIA			9	14	15		1				2		41
HAWAII													0
IDAHO				1			1						2
ILLINOIS				21							3		24
INDIANA													0
IOWA				3	3	18	9						33
KANSAS		7		9	4	41				6			67
KENTUCKY			3	3	2				1				9
LOUISIANA			8	7	3	1	3	4	1				27
MAINE													0
MARYLAND					2								2
MASSACHUSETTS					3								3
MICHIGAN				4	1	2	13	30	1				51
MINNESOTA				4		30	26	11					71
MISSISSIPPI			1	5	2		1	2					11
MISSOURI				7		1				2			10
MONTANA													0
NEBRASKA				2		57	2						61
NEVADA					1		3	1					5
NEW HAMPSHIRE													0
NEW JERSEY													0
NEW MEXICO													0
NEW YORK					1								1
NORTH CAROLINA			1	1									2
NORTH DAKOTA				1	1	14	3	4					22
OHIO													0
OKLAHOMA		1	2	9	7				1				20
OREGON													0
PACIFIC													0
PENNSYLVANIA													0
PUERTO RICO													0
RHODE ISLAND													0
SOUTH CAROLINA													0
SOUTH DAKOTA				2	3	34	5	4					48
TENNESSEE			1		21								22
TEXAS		6	2	3	13	5	11						40
UTAH													0
VERMONT													0
VIRGINIA					6								6
VIRGIN ISLANDS													0
WASHINGTON						3							3
WEST VIRGINIA													0
WISCONSIN													0
WYOMING						8							8
TOTAL: UNITED STATES	0	15	41	110	136	214	83	71	9	12	14	0	705



# GENERAL SUMMARY OF LIGHTNING, 1984

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

Lightning killed 67 people and injured 253 during 1984. The 67 fatalities are well below the 26-year average of 99. The number of injuries was slightly above the 26-year average of 249. A marked increase (from the national average) in deaths occurred at the following locations: open fields, 37 percent versus 27 percent; under trees, 24 versus 16 percent; and on golf courses, 11 versus five percent. For comparative purposes, the location and percentage frequency of lightning fatalities and injuries are given in Table I.

TABLE I

## LOCATION AND PERCENTAGE FREQUENCY OF LIGHTNING DEATHS AND INJURIES

<u>LOCATION</u>	<u>PERCENTAGE FREQUENCY</u>			
	<u>1959-1984</u>		<u>1984</u>	
	<u>DEATHS</u>	<u>INJURIES</u>	<u>DEATHS</u>	<u>INJURIES</u>
Open fields, ball fields, etc.	27	29	37	40
Under trees	16	13	24	15
Boating, fishing and water related	13	6	11	9
Tractors, heavy road equipment, etc.	6	3	6	5
Golf courses	5	5	11	7
Telephones	1	3	1	2
Various other and unknown locations	32	41	10	22

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

**FEBRUARY** -- Lightning struck a car radio antenna as a man and his wife were driving through Haileyville, Oklahoma. Both tires on the left side were blown out, and the radio and voltage regulator were destroyed. No injuries were reported.

**MARCH** -- In Cherokee, Alabama three people were injured when lightning struck a television antenna; and current traveled through the antenna cable which caused the television to explode and set the house on fire. The amount of damage to the house was unknown. Lightning struck a television antenna and entered a Mount Sherman, Kentucky house, jumped the space to the unplugged television, and then destroyed it and the telephone junction box located outside the house. Another incident occurred near Lafayette, Tennessee when lightning struck a television antenna, caused the television to explode, and then set the interior of the house on fire. The house had extensive smoke and fire damage. Three people suffered minor cuts and bruises when making their escape from the burning structure.

**APRIL** -- Near Galva, Iowa a couple were driving home from church when their automobile was struck by lightning. The bolt of lightning traveled through the citizens-band radio antenna. Three tires were blown out, and the car's electrical system was burned out. No injuries were reported. In Arlington, Texas a coach and several youths were on a soccer field when lightning struck. Eleven year-old Nicky Schnider was knocked unconscious by a direct hit, and his clothes were ripped from his body. He stopped breathing and his heart stopped beating. Fortunately the youngster survived the ordeal, thanks to a registered nurse who applied cardiopulmonary resuscitation. The coach and another youth were slightly injured.

**MAY** -- A woman from Frisco City, Alabama was injured by lightning while using a telephone. Near Buckeye, Arizona a farm worker was killed by lightning in an open field while attending irrigation equipment. Lightning struck the top of his head and exited through his left heel (which caused his boot to explode.) His watch and trouser zippers were melted. In Springfield, Massachusetts a bolt of lightning crashed into the kitchen of a third floor apartment, leaving an eight foot hole in the wall where it exited. No fire resulted. Lightning struck a boat on Sheridan Lake, South Dakota; two men standing in the boat were killed, and a third man was slightly injured. The boat windshield was shattered and a life preserver was blown to bits.

**JUNE** -- Four boys from Orange Park, Florida were injured when lightning struck while they were having baseball practice. In Dudley, North Carolina a woman was killed by lightning while talking on a telephone. Another woman was injured by lightning while conversing on a telephone in Lynchburg, South Carolina. In Lennox, South Dakota lightning struck a television antenna and entered a home, destroyed some shingles and shattered several rafters. Considerable damage was done to the electrical wiring and telephones. In Seminole, Oklahoma lightning struck an oil storage area; the ensuing fire destroyed eight tanks. Damage

## GENERAL SUMMARY OF LIGHTNING

was estimated at \$100,000. A man was killed on a golf course located on Wright/Patterson Air Force Base, Ohio. Four golfers were injured at the London Country Club, London, Kentucky. Another four people were injured on a golf course in Lake County, Ohio. Two other golfers were injured while golfing near Perrysburg, Ohio.

JULY -- In Tucson, Arizona a man was struck and killed by an apparent bolt of lightning while playing golf. His partner was not injured. Heavy rain was occurring about three miles (4.8 km) away, but not at the golf course. Lightning struck two men while playing golf at a country club northwest of Houston, Texas. One man was killed instantly and the other received minor injuries. Near Olga, Florida, two girls were injured by lightning while wading near the shoreline of a river. In Montcalm County, Michigan ball lightning was reported to have been rolling along the ground, killing a young boy working in a field. In Lenoir, North Carolina 12 classic automobiles valued at \$500,000 were destroyed when lightning struck and burned the garage they were stored in. Lightning struck a telephone pole and injured a man while he was talking on a telephone in Chillicothe, Ohio.

AUGUST -- In Anthony, Florida lightning struck and killed a husband and wife who were standing in their back yard. There was no rain at the time of the incident. In Tompkinsville, Kentucky lightning struck a television antenna causing the set to explode. The resulting fire was limited to the bedroom and caused minor damage. Lightning injured three boys while practicing football at the Macedonia School, in Monks Corner, South Carolina. In Milan, Tennessee a man was struck by lightning which burned his head, neck and knocked him unconscious. The lightning bolt had previously struck a nearby tree. Quick response by a young man, who administered cardiopulmonary resuscitation, saved the stricken man's life. Lightning destroyed a 27,000 barrel tank of crude oil in McLennan County, Texas. Two men were killed by lightning on a golf course 2 miles (3.2 km) northwest of Brighton, Michigan. Four golfers were seriously injured by lightning on a golf course near Middletown, Ohio.

SEPTEMBER -- Lightning continued to harass golfers. Four golfers on a golf course in Pequannock Township, Warren County, New Jersey were struck by lightning while standing under a large tree and using umbrellas to ward off the rain. Two men were killed. The survivors said they were attempting to light cigarettes and that was the last they remembered before being knocked unconscious. In Plymouth, Ohio lightning struck and killed a golfer while walking along the fairway. A woman in Sault Sainte Marie, Michigan was injured by lightning while using a telephone. Four men loading containers on a freighter in Miami, Florida were injured by lightning. Light drizzle was occurring at the time lightning struck. In Chester County, Pennsylvania a single bolt of lightning hit a playing field while a soccer game was in progress. Twenty-six people were injured. Four of the injured were hospitalized, one in critical condition died five days later. In Tucson, Arizona lightning instantly killed one man and injured two other men. The fourth member of the group, a woman, was hospitalized in critical condition and died 10 days later. All four people were huddled beneath a tree.

OCTOBER -- Lightning struck a home in Newport, Arkansas leaving large holes in two walls. The ceiling support was weakened and caused it to sag. The explosion created by the lightning strike sent bricks flying through the air and caused extensive damage to furniture. In Rogers, Arkansas lightning struck a communications antenna which damaged the entire police and fire department communications network.

NOVEMBER -- In Tacoma, Washington a bolt of lightning struck a radio antenna mounted on top of a fir tree. The charge traveled through the antenna wire into the house, blew a hole in the wall, and ripped off a considerable amount of siding. Cupboard doors were blown open and debris covered the floor.

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 1959-1984. 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, 1984

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	1	0	2	0	2	0	0	0	5
ARKANSAS	0	0	0	0	0	0	2	1	0	0	0	0	3
CALIFORNIA	0	0	0	0	0	0	1	0	0	0	0	0	1
COLOPADO	0	0	0	0	0	2	1	1	0	0	0	0	4
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	1	0	2	1	2	4	0	0	0	0	10
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	0	0	0	0	0
INDIANA	0	0	0	0	0	0	0	0	1	0	0	0	1
IOWA	0	0	0	0	0	0	0	0	0	0	0	0	0
KANSAS	0	0	0	0	0	0	0	0	0	0	0	0	0
KENTUCKY	0	0	0	0	0	0	0	0	0	0	0	0	0
LOUISIANA	0	0	0	0	1	0	2	1	0	0	0	0	4
MAINE	0	0	0	0	0	0	0	0	0	0	0	0	0
MARYLAND	0	0	0	0	0	0	0	0	0	0	0	0	0
MASSACHUSETTS	0	0	0	0	0	0	0	0	0	0	0	0	0
MICHIGAN	0	0	0	0	0	0	1	2	0	0	0	0	3
MINNESOTA	0	0	0	0	0	1	1	0	0	0	0	0	2
MISSISSIPPI	0	0	0	0	1	1	1	0	0	0	0	0	3
MISSOURI	0	0	0	0	0	0	0	0	0	0	0	0	0
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	0	0	0	0	2	0	0	0	2
NEW MEXICO	0	0	0	0	0	0	1	1	0	0	0	0	2
NEW YORK	0	0	0	0	0	0	3	0	0	0	0	0	3
NORTH CAROLINA	0	0	0	0	2	4	1	0	0	0	0	0	7
NORTH DAKOTA	0	0	0	0	0	0	0	0	0	0	0	0	0
OHIO	0	0	0	0	0	3	0	0	1	0	0	0	4
OKLAHOMA	0	0	0	0	0	0	0	0	0	0	0	0	0
OREGON	0	0	0	0	0	0	0	0	0	1	0	0	1
PENNSYLVANIA	0	0	0	0	0	0	0	0	1	0	0	0	1
PUERTO RICO	0	0	0	0	0	0	0	0	0	0	0	0	0
RHODE ISLAND	0	0	0	0	0	0	0	0	0	0	0	0	0
SOUTH CAROLINA	0	0	0	0	0	0	0	0	0	0	0	0	0
SOUTH DAKOTA	0	0	0	0	2	0	0	0	0	0	0	0	2
TENNESSEE	0	0	0	2	0	1	0	0	0	0	1	0	4
TEXAS	0	0	0	1	0	0	1	0	0	0	0	0	2
UTAH	0	0	0	0	1	0	1	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	0	0	0	0	0	0	0	0
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	0	0	0	0	0	0	0	0	0
WYOMING	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	1	3	10	14	20	10	7	1	1	0	67

## LIGHTNING INJURIES, 1984

STATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
ALABAMA	0	0	3	0	1	1	2	0	1	2	0	0	10
ALASKA	0	0	0	0	0	0	0	0	0	0	0	0	0
ARIZONA	0	0	0	0	0	0	1	0	2	0	0	0	3
ARKANSAS	0	0	0	0	0	0	0	1	0	1	0	0	2
CALIFORNIA	0	0	0	0	0	0	0	0	0	0	0	0	0
COLORADO	0	0	0	0	0	0	1	1	0	0	0	0	2
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	1	0	3	4	6	4	4	0	0	0	22
GEORGIA	0	0	1	0	1	1	8	0	0	0	0	0	11
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	1	0	0	0	0	1
INDIANA	0	0	0	0	1	0	0	0	0	0	0	0	1
IOWA	0	0	0	0	0	1	2	0	0	0	0	0	3
KANSAS	0	0	0	0	0	1	0	1	0	0	0	0	2
KENTUCKY	0	0	0	0	0	4	1	0	0	0	0	0	5
LOUISIANA	0	0	0	0	0	0	3	4	0	0	0	0	7
MAINE	0	0	0	0	0	0	0	0	0	0	0	0	0
MARYLAND	0	0	0	0	0	1	0	0	0	0	0	0	1
MASSACHUSETTS	0	0	0	0	0	1	3	0	0	0	0	0	4
MICHIGAN	0	0	0	1	0	5	0	4	1	0	0	0	11
MINNESOTA	0	0	0	0	0	0	1	5	1	0	0	0	7
MISSISSIPPI	0	0	1	0	0	0	1	1	0	0	1	0	4
MISSOURI	0	0	0	0	0	0	0	0	0	0	0	0	0
MONTANA	0	0	0	0	0	0	0	0	0	0	0	0	0
NEBRASKA	0	0	0	0	0	0	1	0	0	0	0	0	1
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	0	0	0	0	2	0	0	0	2
NEW MEXICO	0	0	0	0	0	0	3	3	0	0	0	0	6
NEW YORK	0	0	0	1	0	1	6	5	3	0	0	0	16
NORTH CAROLINA	0	0	0	0	0	1	5	2	1	0	0	0	9
NORTH DAKOTA	0	0	0	0	0	0	0	0	0	0	0	0	0
OHIO	0	0	0	0	0	8	3	6	0	0	0	0	17
OKLAHOMA	0	0	0	0	0	0	0	0	0	1	0	0	1
OREGON	0	0	0	0	0	0	0	0	0	0	0	0	0
PENNSYLVANIA	0	0	0	0	0	7	6	3	28	0	0	0	44
PUERTO RICO	0	0	0	0	0	0	0	0	0	0	0	0	0
RHODE ISLAND	0	0	0	0	0	0	1	0	0	0	0	0	1
SOUTH CAROLINA	0	0	0	0	2	1	10	7	0	0	0	0	20
SOUTH DAKOTA	0	0	0	0	1	5	2	0	0	0	0	0	8
TENNESSEE	0	0	0	0	2	0	10	1	1	0	0	0	14
TEXAS	0	0	1	3	0	0	1	1	0	3	0	0	9
UTAH	0	0	0	0	1	0	2	3	0	0	0	0	6
VERMONT	0	0	0	0	0	0	0	0	0	0	0	0	0
VIRGINIA	0	0	0	0	0	0	0	0	0	0	0	0	0
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	1	1	1	0	0	0	0	0	3
WYOMING	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	7	5	13	43	80	53	44	7	1	0	253

## TOTAL DEATHS BY STATE FOR PERIOD 1959-84

STATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
ALABAMA	0	0	2	2	4	16	24	14	1	1	0	0	64
ALASKA	0	0	0	0	0	0	0	0	0	0	0	0	0
ARIZONA	0	0	0	0	2	1	16	13	9	0	0	0	41
ARKANSAS	0	0	8	0	11	28	27	19	3	0	0	0	96
CALIFORNIA	0	0	0	0	0	2	3	5	3	0	0	0	13
COLORADO	0	0	0	1	9	14	29	15	0	1	0	0	69
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	68	62	32	2	1	1	255
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	7	2	0	0	64
INDIANA	0	0	1	2	6	21	15	12	5	2	0	0	64
IOWA	0	0	1	3	9	14	6	13	4	4	0	0	54
KANSAS	0	0	0	3	8	5	13	7	4	1	2	0	43
KENTUCKY	1	0	0	2	7	16	15	9	10	0	0	0	60
LOUISIANA	0	0	1	5	8	19	37	13	11	0	2	1	97
MAINE	0	0	0	0	0	3	5	6	0	3	0	0	17
MARYLAND	0	0	0	0	2	5	6	6	1	0	0	81	101
MASSACHUSETTS	0	0	0	1	3	3	5	7	1	0	0	0	20
MICHIGAN	0	0	0	1	6	19	20	21	5	0	0	0	72
MINNESOTA	0	0	0	2	2	8	6	12	8	1	0	0	39
MISSISSIPPI	1	0	4	2	11	9	23	17	5	0	0	0	72
MISSOURI	0	0	5	4	19	18	10	8	3	1	0	0	68
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	2	7	17	14	5	0	0	0	46
NEW MEXICO	0	0	0	1	3	8	21	26	4	0	0	0	63
NEW YORK	0	0	0	0	5	18	51	25	4	2	0	0	105
NORTH CAROLINA	0	1	4	2	20	29	45	32	4	0	0	0	137
NORTH DAKOTA	0	0	0	0	0	4	3	3	0	0	0	0	10
OHIO	0	0	0	3	7	21	38	14	8	2	2	0	95
OKLAHOMA	1	1	1	9	12	11	7	15	11	3	1	0	72
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	5	8	5	3	0	0	24
RHODE ISLAND	0	0	0	0	0	0	1	0	2	0	0	0	3
SOUTH CAROLINA	0	0	1	0	5	9	29	11	6	0	0	0	61
SOUTH DAKOTA	0	0	0	0	4	1	4	1	3	3	0	0	16
TENNESSEE	0	1	1	6	12	30	16	17	13	2	3	0	101
TEXAS	0	0	0	13	24	14	36	21	14	7	1	0	130
UTAH	0	0	0	0	1	5	3	6	2	0	0	0	17
VERMONT	0	0	0	0	0	4	5	4	0	0	0	0	13
VIRGINIA	0	0	0	0	9	6	8	8	2	0	0	0	33
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	0	8	12	10	2	1	1	1	36
WYOMING	0	0	0	0	2	4	7	6	2	0	0	0	21
TOTAL	3	4	35	76	264	545	737	551	218	44	13	84	2574

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 1959-84

STATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
ALABAMA	6	1	10	2	3	14	53	37	1	4	0	0	131
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	9	26	15	30	57	9	1	0	1	153
CALIFORNIA	1	0	0	4	0	0	6	7	1	0	1	1	21
COLOPADO	0	0	0	0	21	39	43	43	5	0	0	0	151
CONNECTICUT	0	0	2	0	3	17	12	11	6	0	0	0	51
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	26	160	166	159	120	27	0	1	685
GEORGIA	0	0	3	2	18	40	101	31	3	5	0	0	203
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	20	1	0	0	128
INDIANA	0	0	2	4	19	31	26	21	1	0	0	0	104
IOWA	0	0	1	7	21	40	35	17	16	3	1	0	141
KANSAS	0	0	5	10	13	23	37	24	26	4	1	0	143
KENTUCKY	0	0	0	2	19	54	47	17	10	1	0	0	150
LOUISIANA	1	0	6	2	13	13	94	36	13	0	1	1	180
MAINE	0	0	0	0	3	5	18	46	0	0	1	0	73
MARYLAND	0	0	0	0	21	16	31	17	5	0	0	0	90
MASSACHUSETTS	0	0	1	11	16	31	103	72	26	4	2	1	267
MICHIGAN	0	0	1	9	33	126	87	186	19	6	0	0	467
MINNESOTA	0	0	0	0	8	17	15	18	7	3	0	0	68
MISSISSIPPI	1	2	4	2	10	10	98	31	6	2	2	1	169
MISSOURI	0	1	1	8	15	16	4	15	3	2	4	0	69
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	2	2	0	0	0	50
NEW JERSEY	0	0	0	0	3	11	49	18	16	0	0	0	97
NEW MEXICO	0	0	0	1	17	9	32	21	6	0	0	0	86
NEW YORK	0	0	0	1	4	49	86	119	23	3	1	0	286
NORTH CAROLINA	0	2	27	12	38	59	92	101	17	2	1	0	351
NORTH DAKOTA	0	0	0	0	2	0	0	4	4	0	0	0	10
OHIO	0	0	3	3	29	47	42	89	42	4	11	0	270
OKLAHOMA	1	1	3	14	27	36	30	32	19	19	5	2	189
OREGON	0	0	0	0	2	2	0	9	3	0	0	0	16
PENNSYLVANIA	0	5	0	0	9	74	77	133	41	2	0	0	341
PUERTO RICO	0	0	0	0	0	0	1	0	2	1	0	0	4
RHODE ISLAND	0	2	0	0	1	5	5	11	2	0	1	0	27
SOUTH CAROLINA	0	0	0	3	19	7	89	25	19	0	0	0	162
SOUTH DAKOTA	0	0	0	1	3	18	8	6	1	2	0	0	39
TENNESSEE	0	1	4	2	28	49	75	46	19	4	0	0	228
TEXAS	0	2	5	31	41	38	33	34	23	10	2	0	219
UTAH	0	0	0	0	2	18	8	14	4	0	0	0	46
VERMONT	0	0	0	0	0	3	10	2	0	0	0	0	15
VIRGINIA	0	0	0	2	7	12	39	24	1	0	0	0	85
WASHINGTON	0	0	0	0	4	1	7	7	0	0	0	0	19
WEST VIRGINIA	0	0	0	0	0	2	22	25	1	1	0	0	51
WISCONSIN	0	1	2	2	5	26	51	18	7	2	2	0	116
WYOMING	0	0	0	0	4	32	17	21	6	0	0	0	80
TOTAL	13	21	95	163	587	1265	1889	1700	580	114	37	8	6472

## TOTAL DEATHS BY YEARS FOR PERIOD 1959-84

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	18	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
TOTAL	3	4	35	76	264	545	737	551	218	44	13	84	2574
AVERAGE	0	0	1	3	10	21	28	21	8	2	1	3	99

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 YEARS FOR PERIOD 1959-84

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
TOTAL	13	21	95	163	587	1265	1889	1700	580	114	37	8	6472
AVERAGE	1	1	4	6	23	49	73	65	22	4	1	0	249

# NORTH ATLANTIC TROPICAL CYCLONES, 1984

GILBERT B. CLARK  
AND  
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NATIONAL HURRICANE CENTER, NOAA  
MIAMI, FL

Tropical cyclone activity returned to near normal during 1984 after two rather quiet seasons. There were twelve named tropical cyclones and one subtropical storm. Five reached hurricane force and the remaining systems were of storm strength. Table 1 is a listing of this year's storms along with dates, maximum sustained winds and minimum pressure. For comparison, the long-term average is ten named storms per year, out of which six attain hurricane status. Tables 2 and 3 summarize data since 1931.

Figure 1 shows this year's tracks. Most of this season's activity was concentrated in the Atlantic. Tropical storms Arthur, Bertha, Fran and Gustav can be traced to disturbances that came off the African continent. The remaining

storms and hurricanes formed by developing along old frontal zones in association with upper-level troughs of low pressure. An exception was hurricane Klaus, a slow-developing, late-season system that formed from a broad area of disturbed weather in the Eastern Caribbean Sea.

The GOES-East geostationary satellite which provided the primary meteorological satellite coverage of the Atlantic Ocean failed at the end of July. It was indeed fortunate that the tropics remained quiet until late August. By then, the GOES-West satellite had been shifted eastward to partly compensate for the missing satellite coverage.

Because many of this season's tropical cyclones were large and displayed erratic tracks across the shipping lanes, more than 160 ship

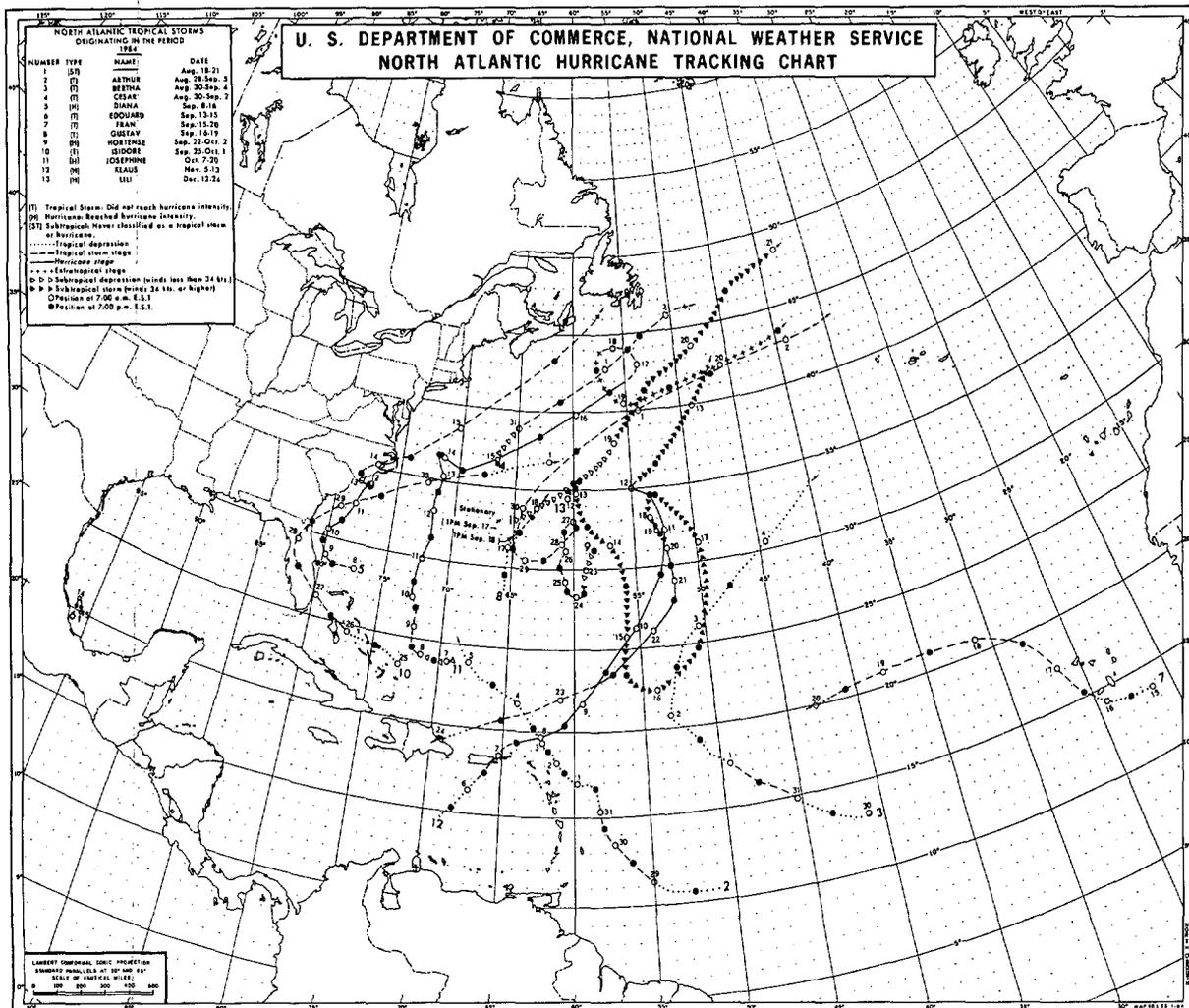


Figure 1.-- North Atlantic tropical cyclone tracks, 1984.

Table 1.-- Tropical cyclone statistics, 1984.

no.	name	class. <sup>1</sup>	dates <sup>2</sup>	maximum sustained wind (kt)	lowest press. (mb)	U.S. damage (\$billions)	deaths
1	-	ST	8/18- 8/21	50	1000		
2	Arthur	T	8/28- 9/05	45	1004		
3	Bertha	T	8/30- 9/04	35	1007		
4	Cesar	T	8/31- 9/02	50	989		
5	Diana	H	9/08- 9/16	115	949	65	3
6	Edouard	T	9/14- 9/15	55	998		
7	Fran	T	9/15- 9/20	55	994		
8	Gustav	T	9/16- 9/19	45	1006		
9	Hortense	H	9/23-10/02	65	993		
10	Isidore	T	9/25-10/01	50	999	1	1
11	Josephine	H	10/07-10/21	90	965		
12	Klaus	H	11/06-11/13	80	971		
13	Lilli	H	12/12-12/24	70	980		

<sup>1</sup> T: tropical storm, wind speed 34 - 63 kt.  
H: hurricane, wind speed 64 kt or higher.  
ST: subtropical storm, wind speed 34 - 63 kt.

<sup>2</sup> The day begins at 0000 GMT.

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	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	1	3	1		8	
1939		1	1	1	1	2			5	
1940	1		3	2	2				8	
1941					4	2			6	
1942				3	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	1		9	
1949			1	3	7	2	1		13	
1950				4	3	6			13	
1951		1		3	4	2			10	
1952	(Feb)			2	2	2			7	
1953		1		3	4	4	1	1	14	
1954		1	1	2	4	1	1	1	11	
1955			1	4	5	2			12	
1956		1	1	1	4	1			8	
1957		2	1	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		1		7	
1973			2	2	2	2			8	
1974		1	1	4	4	1			11	
1975		1	1	2	3	1		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	3	5	1	2		11	
1981		1	1	2	5	1	1		11	
1982		1	1	1	2	1			5	
1983				2	2				4	
1984				4	6	1	1	1	13	
1985										
Totals	(Jan) (Feb)	12	29	41	136	186	96	21	4	527

reports of 35 kn winds or higher were received at the National Hurricane Center. About 20 percent of the ship reports indicated winds of 50 kn or more. Table 4 is a list of these vessels.

**SUBTROPICAL STORM, AUGUST 18-21**

A low pressure area formed in a weak frontal trough near Bermuda on 18 August and became a subtropical storm 36 hr later as it moved rapidly northeastward through the shipping lanes. The ship DIADEMA (PJKE) reported winds of 150 degrees at 40 kn and a surface pressure of 1003.9 mb at 0000 on 20 August near 41.2°N and 53.0°W. This report allowed a "calibration" of the satellite estimates of the system's strength. The storm was estimated to have winds of 50 kn during the 20th, then it weakened and merged with a frontal trough on 21 August.

TROPICAL STORM ARTHUR, AUGUST 28 - SEPTEMBER 5  
TROPICAL STORM BERTHA, AUGUST 30 - SEPTEMBER 4

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

	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1931					2				2
1932				3	1		1		6
1933		1	1	3	3	1			9
1934		1	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			1		4
1943			1	1	2	1			5
1944			2	1	3	1			7
1945		1		1	1	2			5
1946			1		1	1			3
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		1	8
1955				3	5	1			9
1956			1	1	1	1			4
1957		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	2			6
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	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	1				2
1983				2	1				3
1984				2		1	1	1	5
1985									
Totals	2	12	19	86	118	50	11	2	300

Table 4.-- Ships encountering tropical cyclone winds of 50 kn or more in the North Atlantic, 1984

TROPICAL CYCLONE	VESSEL CALL SIGN	DATE		TIME GMT	SHIP POSITION		WIND		PRESSURE (MB)
		MO	DAY		LAT. °N	LONG. °W	DIR. 0°	SPEED (KN)	
<u>ARTHUR</u>	(None)								
<u>BERTHA</u>	(None)								
<u>CESAR</u>	WGZL	09	02	1800	46.7	48.5	07	50	990.8
	VSBC	09	02	1800	46.6	48.0	08	50	991.0
<u>DIANA</u>	(None)								
<u>EDOUARD</u>	(None)								
<u>FRAN</u>	(None)								
<u>GUSTAV</u>	(None)								
<u>HORTENSE</u>	KSLB	10	01	1200	40.0	53.7	17	50	998.0
<u>ISIDORE</u>	(None)								
<u>JOSEPHINE</u>	GSPA	10	09	1800	27.6	71.9	09	50	1003.3
	GSPA	10	10	0000	27.6	73.2	02	60	1002.4
	PPEB	10	10	1800	26.5	69.7	17	50	1009.8
	LRQU	10	11	1800	32.8	69.4	21	75	1014.9
	ERQU	10	12	0100	34.7	71.6	12	75	1011.6
	PEBD	10	12	2100	36.2	71.7	05	50	1011.0
	3ELE	10	14	0000	37.8	73.7	02	50	---
	WEZU	10	14	1200	35.0	72.3	28	55	992.8
	WEZU	10	14	1800	35.3	72.6	30	65	990.5
	VCNP	10	16	1200	43.4	61.1	03	50	1004.5
	DCKE	10	16	1800	42.7	56.0	04	80	---
	OWCY	10	16	1800	42.5	56.6	05	50	988.0
	DCKE	10	17	0000	42.7	57.0	05	65	---
	GGDG	10	17	0000	43.3	58.6	03	55	---
	VCNP	10	17	0000	43.6	61.0	01	50	1012.5
	KMHF	10	17	0000	44.7	58.0	03	50	1008.2
	GZCM	10	17	0600	44.9	53.9	05	50	1001.0
	KMHF	10	17	0600	44.6	58.0	03	50	1008.5
	GZCM	10	17	1200	45.0	55.3	03	60	1004.1
	FNLO	10	17	1200	46.0	52.3	06	50	1011.0
	KMHF	10	17	1200	44.0	53.0	01	50	1009.0
	GZCM	10	17	1800	45.3	56.7	02	50	1006.5
	FNLO	10	18	0000	46.5	55.2	06	50	1008.5
	ELDA	11	07	1800	22.0	60.4	12	50	999.1
<u>KLAUS</u>	ELDA	11	08	0600	24.0	58.5	11	60	999.6
	GUSG	11	11	0000	32.5	57.0	03	50	1001.7
	GCPZ	11	11	0600	33.0	56.0	01	50	997.0
	DCDV	11	11	1200	32.8	55.6	35	50	1004.0
	GNAG	11	11	1800	35.5	54.2	01	60	992.6
	VPJS	11	11	1800	38.0	45.5	08	55	1012.5
	GCPZ	11	12	0600	34.8	56.8	36	70	990.1
	SPPK	11	12	0600	32.5	50.5	19	60	1002.0
	GCPZ	11	12	1200	35.2	57.0	36	50	988.3
	SPPK	11	12	1200	32.5	50.0	19	50	1008.0
<u>LILI</u>	GUEP	12	20	1200	30.8	52.8	26	63	982.1

Both storms originated from African waves east of the Lesser Antilles in late August. Arthur was a tropical storm for 48 hr and Bertha was one for only 24 hr. A strong upper level westerly shearing pattern contributed to the lack of significant development and eventual dissipation at sea of both storms. During the short time they were tropical storms, there were no ships near their centers.

**TROPICAL STORM CESAR, AUGUST 31 - SEPTEMBER 2**

An organized cloud system located several hundred miles off the southeastern United States coast on 30 August developed into a low-pressure system with tropical characteristics by 31 August. For the next 2 days, as Cesar moved northeastward well to the south of Nova Scotia, more than a dozen ships reported gale-force winds and pressures below 1000 mb. There was

very little satellite data available in this area due to the loss of the GOES-East satellite. Cesar merged with an extratropical low-pressure system to the east of Newfoundland on 2 September.

**HURRICANE DIANA, SEPTEMBER 8-16**

A weak frontal trough, in combination with an upper-level low pressure system, gradually organized into a tropical storm just off the upper Florida east coast on 8 September. Winds of 40 kn were reported by the SEALAND VENTURE (KLJH) east of Jacksonville during the day, indicating the area of gale-force winds was expanding and the storm was strengthening. By 10 September, Diana had become a hurricane and was moving north-northeastward parallel to the Georgia and South Carolina coasts. Over the next 2 days, Diana continued to strengthen and

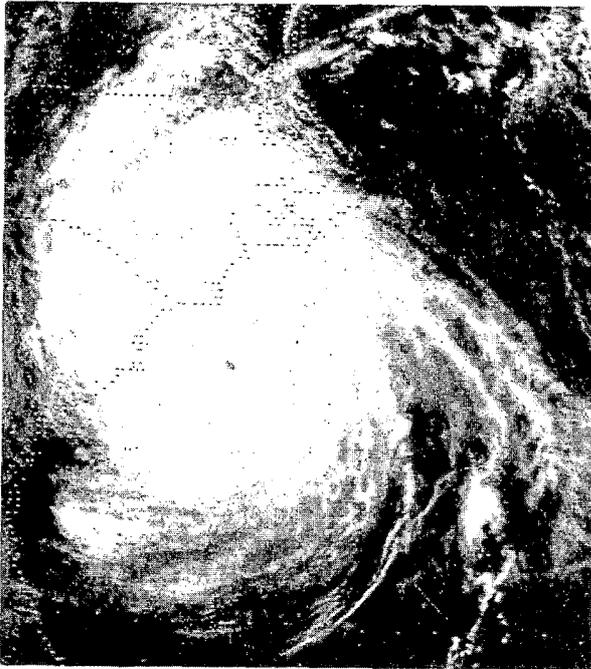


Figure 2.-- Hurricane Diana off the coast near Wilmington, NC at 1700 September 11.

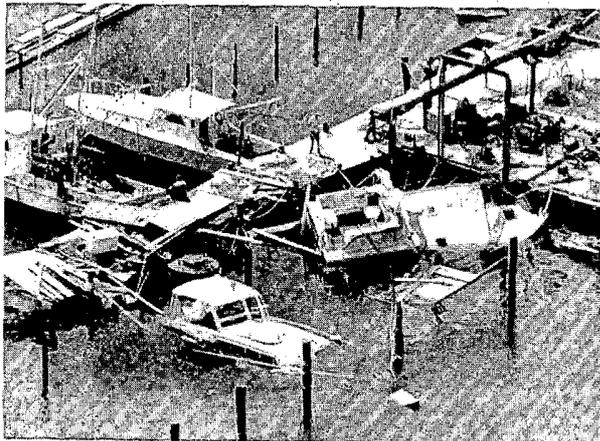


Figure 3.-- Boats damaged by hurricane Diana at Carolina Beach, NC. Wide World Photo.

reached an estimated maximum intensity of 115 kn just off the southeastern North Carolina coast by late on 11 September (fig:2).

After looping and losing strength, the



Figure 4.-- A resident surveys the damage after Diana struck Long Beach, NC early on the 13th. Wide World Photo.

center moved onshore near Wilmington, North Carolina, on the 13th (fig. 3 and 4). Because of the close proximity of the coast and the strength of Diana, few ship reports were received in the area of the storm after 9 September (fig. 5). Diana turned sharply to the northeast and moved offshore as a tropical storm on 15 September. It accelerated to a position off the Canadian Maritime Provinces by the 16th and lost tropical characteristics.

#### TROPICAL STORM EDOUARD, SEPTEMBER 14-15

A stationary low pressure area over the extreme southwest Gulf of Mexico persisted for several days prior to the formation of tropical storm Edouard on 14 September. The storm hovered off the Mexican coast for 2 days with reconnaissance aircraft indicating maximum winds of 55 kn on the 15th. Edouard quickly weakened and its remnants moved inland near Vera Cruz on 16 September. Edouard was a very small system in a sparse data area. As a consequence, no ship observations were received in the vicinity of the storm.

#### TROPICAL STORM GUSTAV, SEPTEMBER 16-19

A tropical disturbance, steered northward by a major trough in the westerlies, developed into a depression near Bermuda on 16 September. On 18 September, it became tropical storm Gustav, then merged with a frontal trough northeast of Bermuda within 24 hr of being named. The storm was quite small and gale

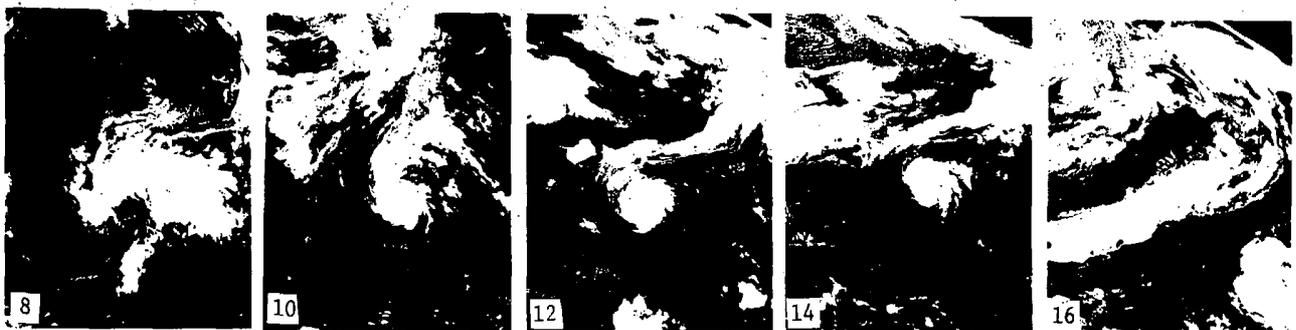


Figure 5.-- Hurricane Diana September 8 to 16 in 2 day increments.

force winds reported by several ships in the area were mainly due to interaction with high pressure to the north of the storm.

#### HURRICANE HORTENSE, SEPTEMBER 23 - OCTOBER 2

A broad low pressure area formed in a frontal cloud band east of Bermuda on 23 September and drifted southward until 24 September, when reconnaissance aircraft confirmed that it was a tropical storm. Hortense turned westward and then moved slowly northward and briefly attained hurricane status on 25 September with aircraft observing a maximum wind of 70 kn and a surface pressure of 993 mb. The weakening storm then made a loop east of Bermuda on 27-28 September (fig.6) and passed almost directly over the island on the 30th. Thereafter, Hortense weakened and accelerated on a northeast to east track, gradually losing tropical characteristics. Hortense then merged with a strong extratropical low which later caused considerable damage and some casualties along the coast of France and Spain (some newspapers reported this as being directly attributable to Hortense). On Hortense's prolonged journey through the mid Atlantic, numerous ships reported winds of gale force or higher. The SEALAND PACER (KSLB) was very near the center at 1200 on 1 October when she reported winds of 170 degrees at 50 kn and a pressure of 998.0 mb.

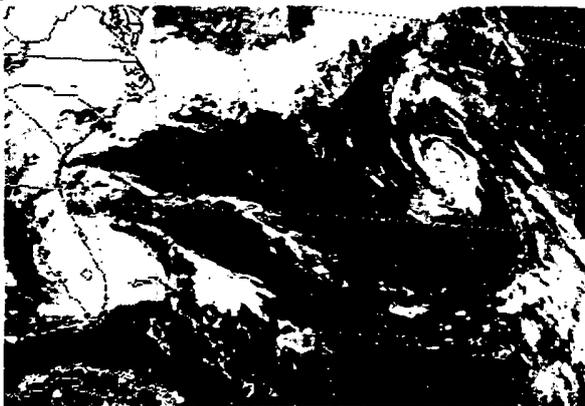


Figure 6 & 7.--Tropical storms Hortense east of Bermuda and Isidore over Florida at 1830 September 27.

#### TROPICAL STORM ISIDORE, SEPTEMBER 25 - OCTOBER 1

A depression formed on 25 September just east of the Bahamas, near the west end of a nearly stationary frontal zone. The next day reconnaissance aircraft and weather reports from the Bahamas indicated Isidore had reached tropical storm status in the central Bahamas. Isidore continued moving toward the west-northwest and made landfall just north of Palm Beach, Florida, on 27 September (fig.7). Maximum sustained winds were near 50 kn just prior to landfall. The storm recurved over northern Florida on the 28th and moved offshore near Jacksonville on the 29th. Isidore attained maximum winds of 50 kn again on the 30th as the storm accelerated toward the east-northeast into the Atlantic. It merged with a frontal zone several hundred miles north of Bermuda on 1 October. More than ten ships reported winds of 35 to 45 kn in association with this storm.

#### HURRICANE JOSEPHINE, OCTOBER 7-21

On 7 October, a broad and diffuse low pressure area formed east of the Bahama Islands in a similar fashion to the development of tropical storm Isidore 12 days earlier. Reconnaissance aircraft reports indicated that the system became tropical storm Josephine during 8 October as it gradually turned to a northerly track. Josephine became a hurricane on 11 October and continued slowly northward (fig. 8) until 14 October. It then turned sharply toward the east and continued on a steady east to northeast course until 17 October. During 18-19 October, Josephine looped several hundred miles south of Newfoundland and gradually lost its tropical character as it merged with a high latitude trough on 21 October.

Josephine was a large and long-lived storm. It affected the major shipping lanes of the North Atlantic for an extended period of time. More than 25 ship reports received were in excess of 50 kn over a period of 9 days. Five of these ships reported winds of hurricane force extending over a period of 6 days. The highest

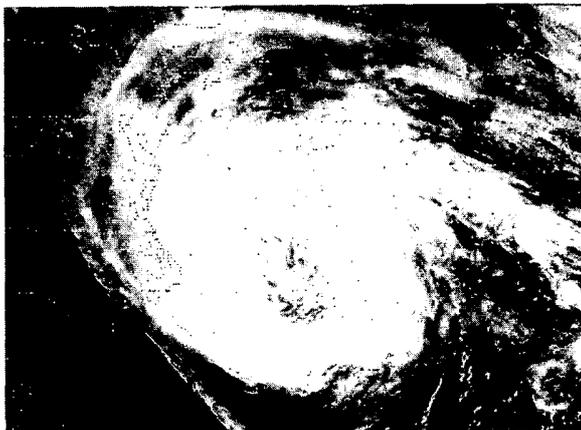


Figure 8.-- Hurricane Josephine east of Cape Hatteras, NC at 1530 October 13. NOAA Image.

ship reported wind was 80 kn on 16 October. This compares with the highest sustained wind of 90 kn measured by reconnaissance aircraft 4 days earlier.

The combination of hurricane Josephine and the large high-pressure system to the north, while the storm was moving slowly parallel to the United States east coast, created strong winds over an extensive area. The winds, combined with abnormally high astronomical tides and large waves, produced damage to marine installations and caused severe beach erosion from the Outer Banks of North Carolina northward to Massachusetts.

#### HURRICANE KLAUS, NOVEMBER 6-13

As early as 3 November, there were signs that something unusual was happening in the eastern Caribbean Sea. Surface winds were out of the west to northwest along the north coast of Venezuela, indicating that a low pressure system was developing. On the afternoon of 6 November, reconnaissance aircraft reported gale-force winds and a surface pressure of 1002 mb, showing that tropical storm Klaus had formed. Klaus moved on an unusual track toward the



Figure 9.-- Hurricane Klaus northeast of Puerto Rico near 27°N, 54.5°W at 1500 November 10. NOAA Image.

northeast with its center passing between Puerto Rico and the Virgin Islands on 7 November. Shortly thereafter, Klaus became a hurricane and remained one until the 12th when it weakened and was downgraded to a subtropical storm on 13 November.

On Klaus's trek through the mid-Atlantic, the large size of the storm (fig. 9) contributed to more than 40 ship reports of gale-force winds. Over 30 of these reports were during the 3 day period 10-12 November. A few ships encountered hurricane force winds during this period.

The unusual northeasterly track and large wind field associated with Klaus caused strong southwesterly winds to affect the Virgin and northern Leeward Islands for several days. This produced onshore gales and rough seas on the usually protected south and west side of these islands. On the island of St. Martin, 31 yachts were beached with 7 destroyed. Some of the major docks on the protected southwest side of the island were heavily damaged. Eighty-three people aboard the Yankee Clipper WINDJAMMER had to abandon ship when it broke loose from its anchorage a mile off St. Martin on 8 November. No one was injured seriously, but the passengers and crew battled 50 mph winds and 12-ft seas to reach shore. It has been reported that a large cruise ship wrecked several boats and damaged dock facilities in the Virgin Islands.

#### HURRICANE LILI, DECEMBER 12-24

Hurricane Lili is only the third hurricane of record (since 1871) to form in the month of December. The first known hurricane occurred in the Atlantic in 1887. In 1954, hurricane Alice, the second December hurricane, formed in the same general area as Lili with a somewhat similar track. Figure 10 shows Lili's rather complicated track.

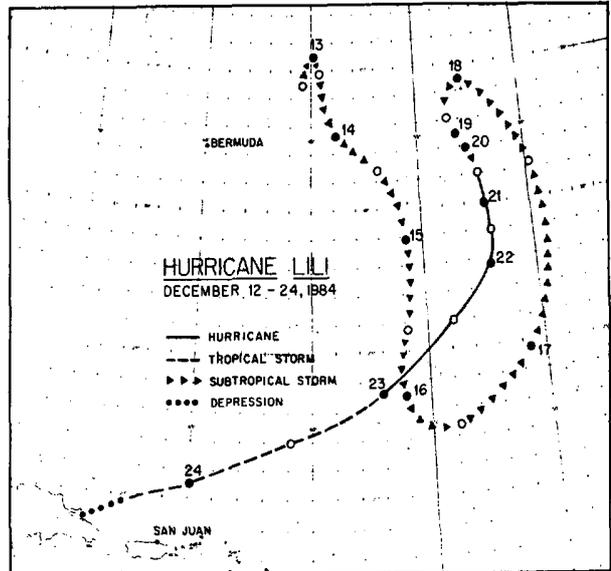


Figure 10.--The track of hurricane Lili during transition from subtropical to a tropical storm December 12-24, 1984.

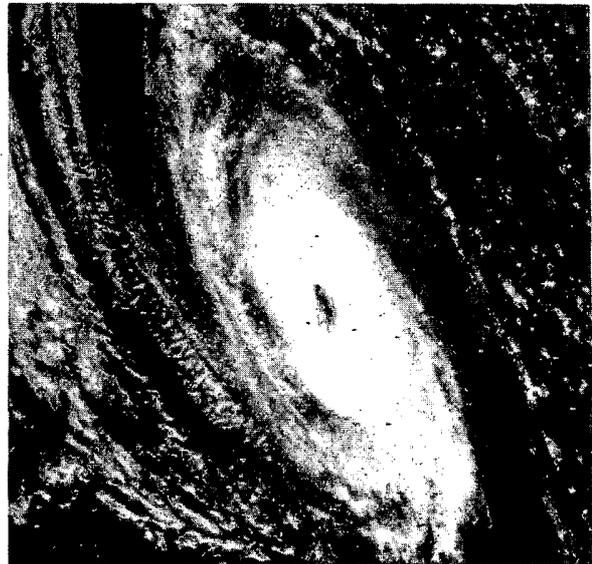


Figure 11.--Hurricane Lili near 25°N, 55°W at 1631 December 22, close to maximum strength. NOAA

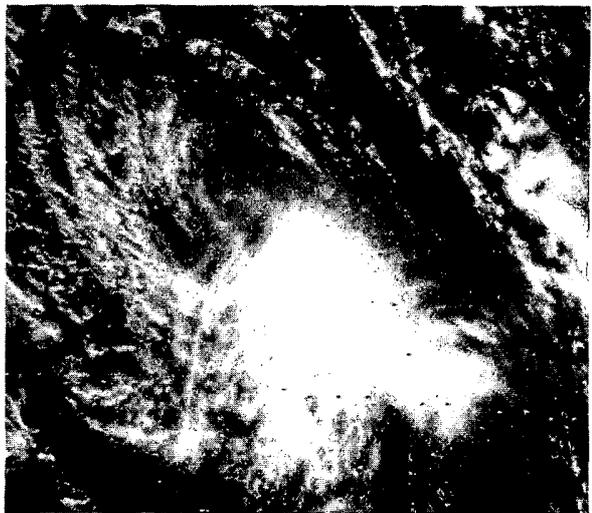


Figure 12.-- Tropical storm Lili approaching the Dominican Republic at 1631 December 23. NOAA

The combination of a large upper-level low pressure system and a nearly stationary frontal zone resulted in the creation of a weak circulation northeast of Bermuda on 11 December. It was carried in the high seas broadcast as a developing gale center starting on 12 December. The subtropical-type storm moved south-southeastward for the next several days before recurving and accelerating northward on 17 December. It again turned toward the south on the 18th and gradually assumed tropical characteristics. The system was classified as hurricane Lili on 20 December. Lili moved on a south to southwest course with an increasing

forward speed for the next few days and then the storm rapidly lost strength. The remnants of Lili moved into northeastern Dominican Republic on 24 December. Figures 11 and 12 show the rapid loss in organization of Lili in a 24-hour period.

During the period 15-23 December, more than 30 ships encountered gale force winds. When an eye-type feature began showing on satellite pictures on 20 December, the presence of a hurricane was confirmed by the ship SCANDIA TEAM (GUEP). At 1200, she reported 63-kn winds and a pressure of 982 mb, while located just south of the eye of the hurricane.

## 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.

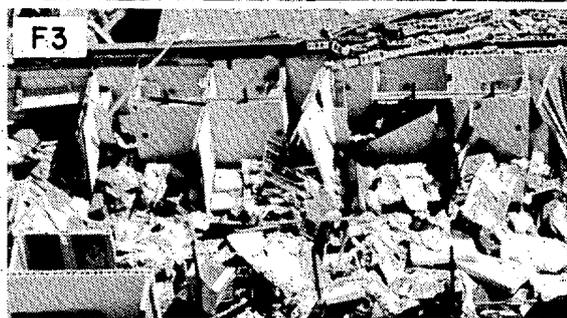
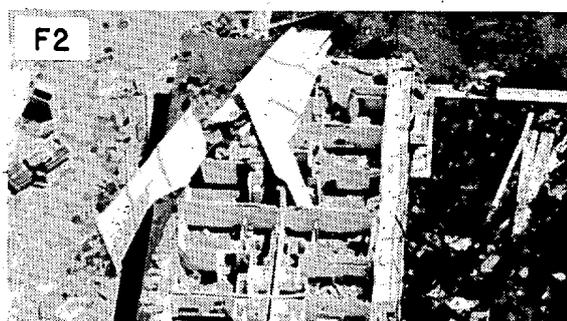
(F5) Incredible tornado (261-318 mph): Incredible damage  
Strong frame houses lifted off foundations and carried considerable distance to disintegrate; automobile-sized missiles fly through the air in excess of 100 m; trees debarked; incredible phenomena will occur.

(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.

(F0+F1) Weak Tornado

(F2+F3) Strong Tornado

(F4+F5) Violent Tornado

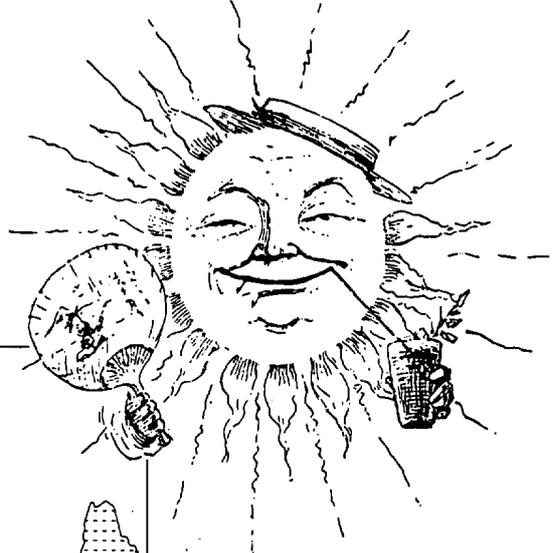


From J. Atmos. Sci., August 1981, p. 1517-1519

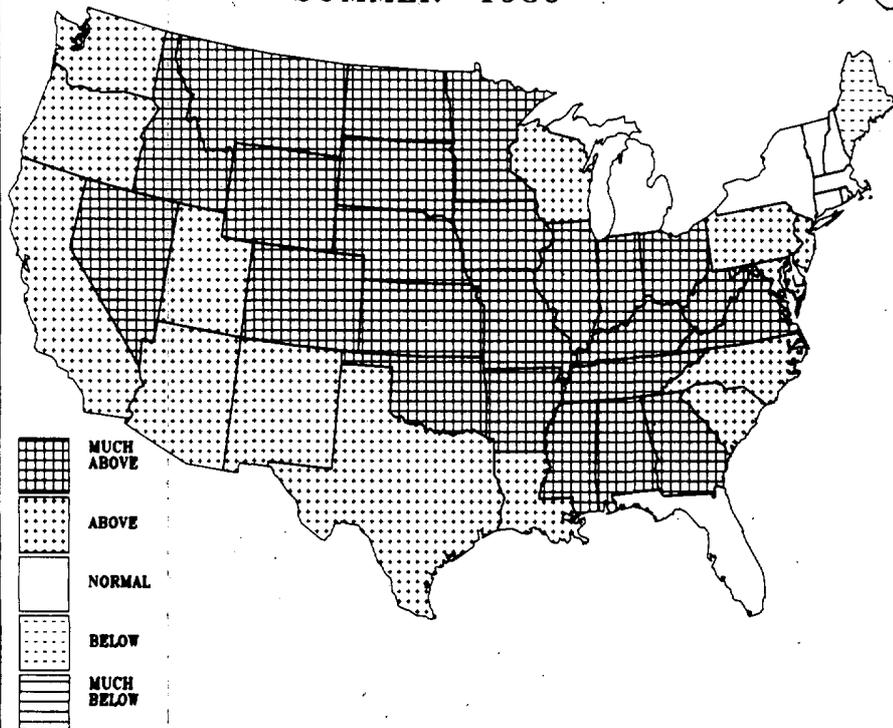
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