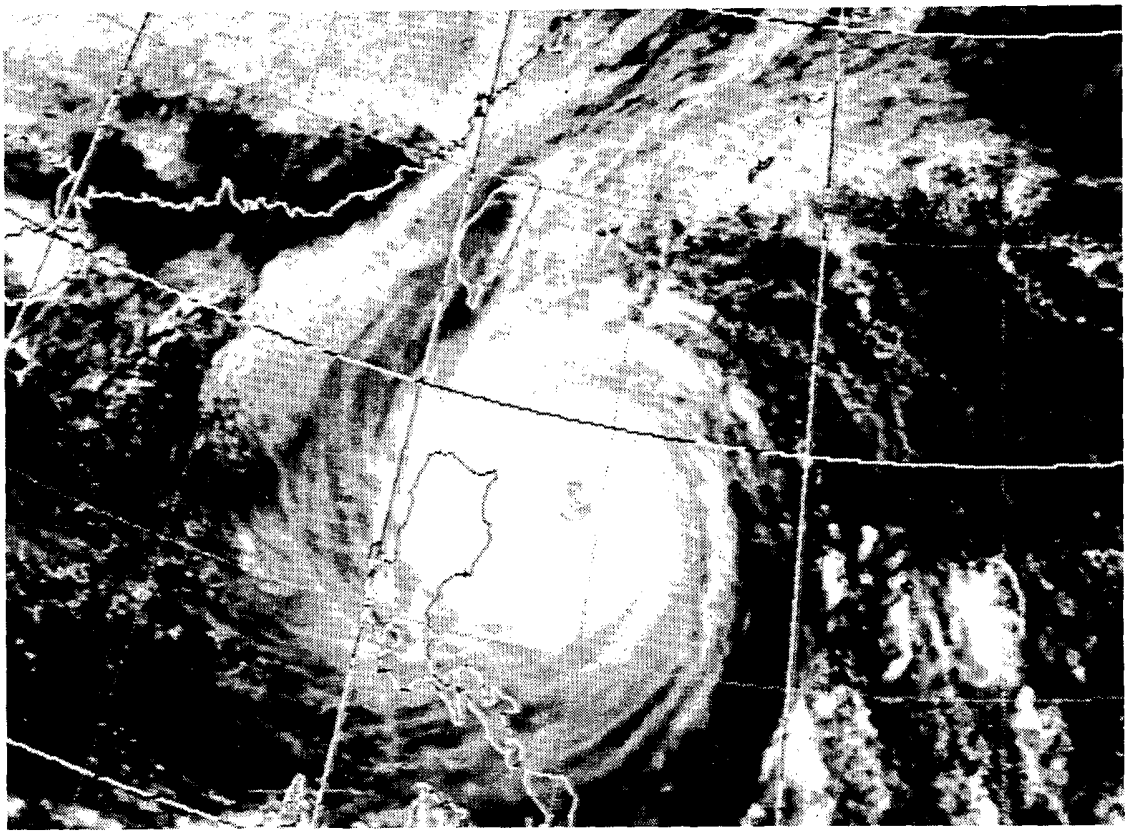
OCTOBER 1987 VOLUME 29 NUMBER 10

STORM DATA

WITH LATE REPORTS/CORRECTIONS



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Kenneth D Wadlow

DIRECTOR
NATIONAL CLIMATIC DATA CENTER

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CONTENTS

Cover: In a Japanese GMS satellite, visible image taken at 0400 UTC on October 23rd, a well-organized spiralling cloud mass and large well-defined eye give testament to the strength of Typhoon LYNN as the storm was about to pass between Taiwan and the Philippines before dissipating in the South China Sea. Earlier, LYNN passed through the U.S. territorial Marianas Islands (see TYPHOON LYNN in the WESTERN PACIFIC .... pages 12 and 13). ---Photo from the National Environmental Satellite Data and Information Service, Washington, DC.

STORM DATA
(ISSN 0039-1972)

The section on Outstanding Storms of the Month is prepared by Professor T. Theodore Fujita, editor, and Duane J. Stiegler, associate editor, the University of Chicago, with funding by the U. S. Office of Naval Research. The Storm Data and Unusual Weather Phenomena narratives, and summaries of Hurricanes/Tropical Storms are prepared by the National Weather Service. The National Climatic Data Center compiles statistics on deaths, injuries, damage and prepares the annual summaries of tornadoes and Lightning. 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. Maps of zones used in the Storm Data and Unusual Weather Phenomena will be published in all editions.

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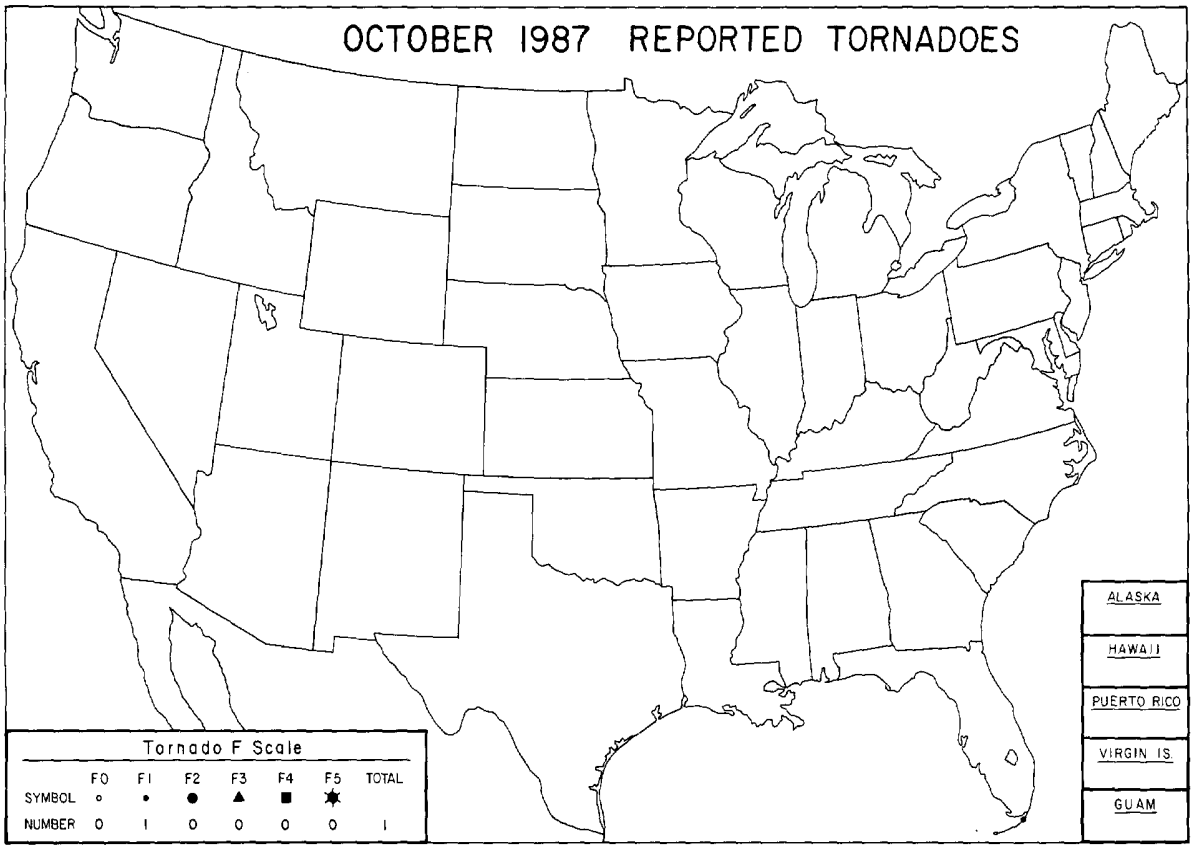
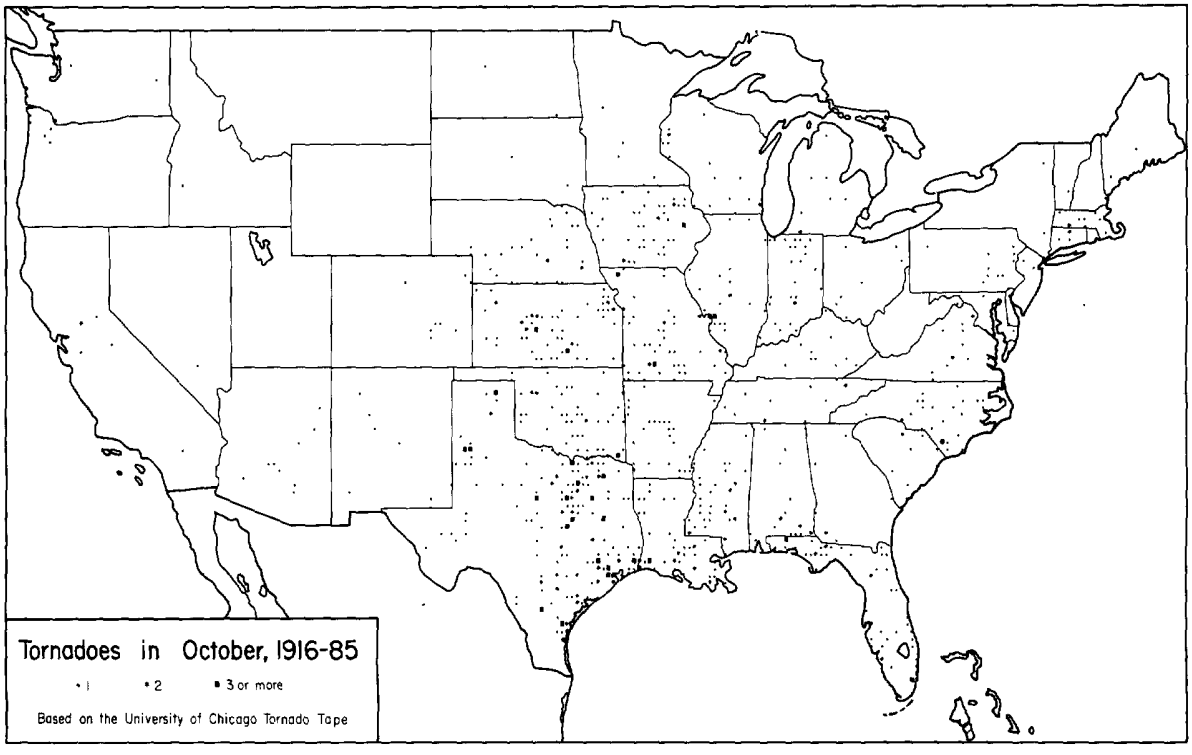
OUTSTANDING STORMS OF THE MONTH

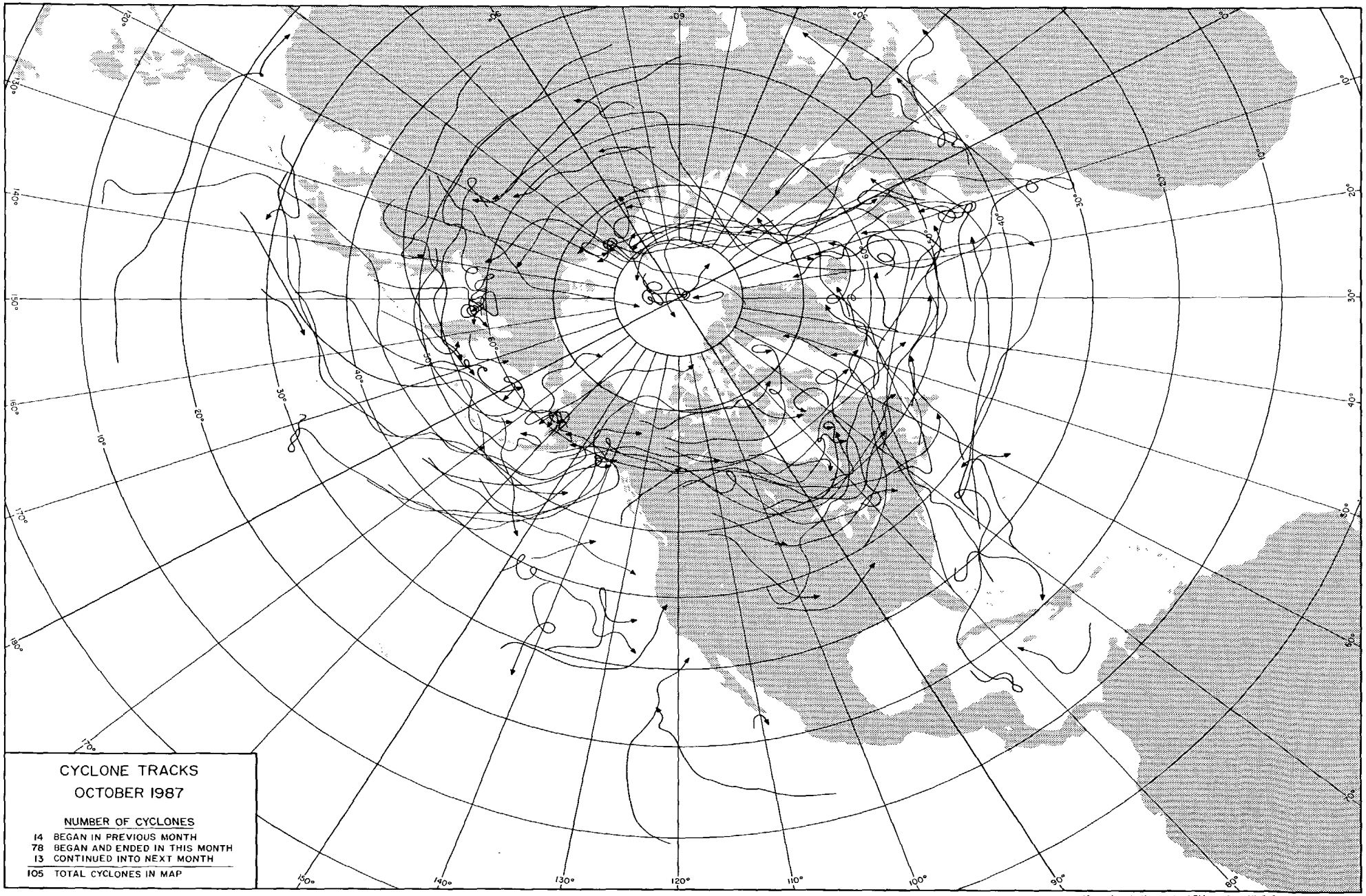


● COMPLETE REPORT RECEIVED
◑ PRELIMINARY REPORT RECEIVED
○ REPORT NOT RECEIVED

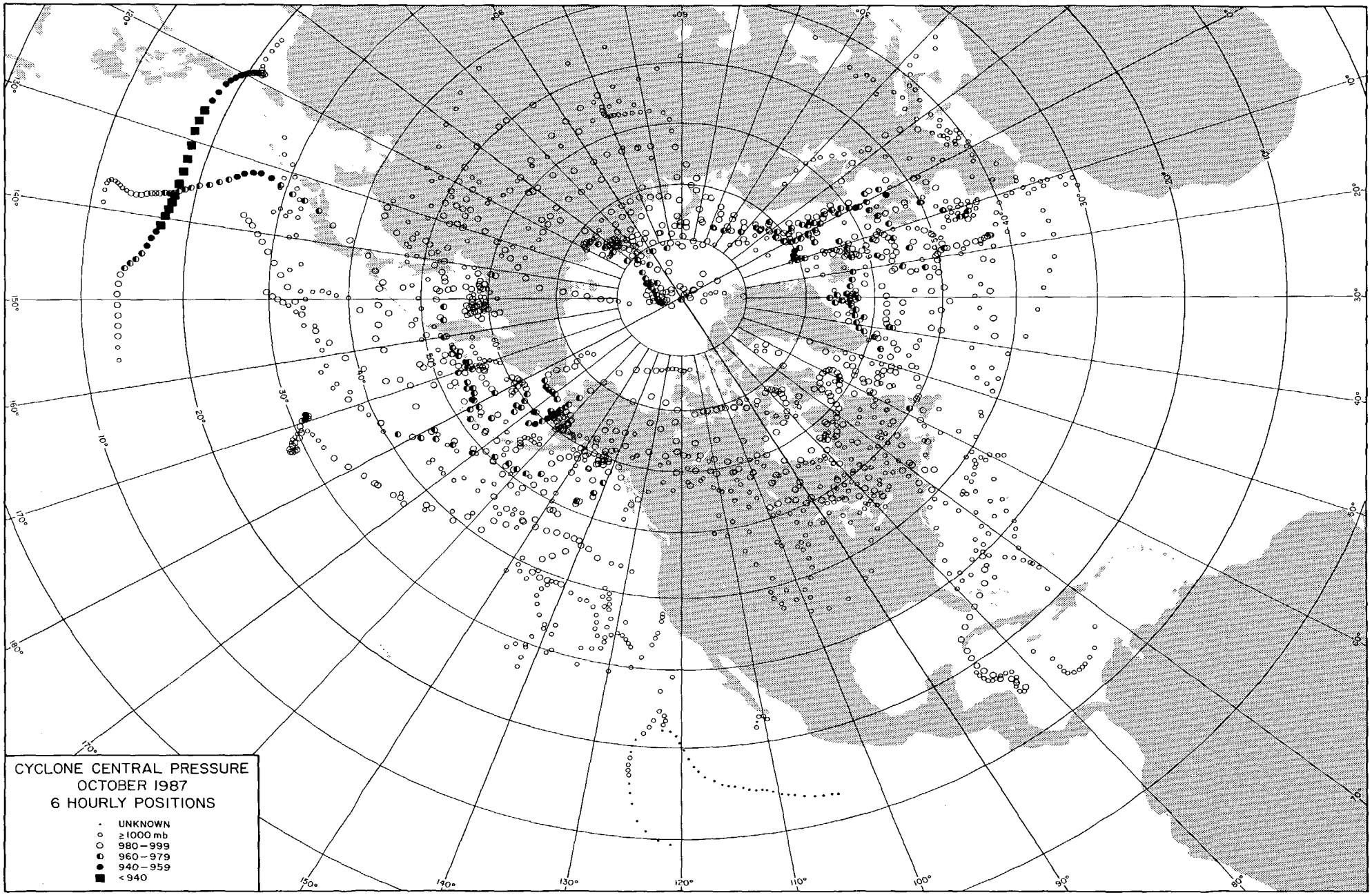
(N) northern (W) western
(S) southern (C) central
(E) eastern (O) coastal
(SE) southeastern

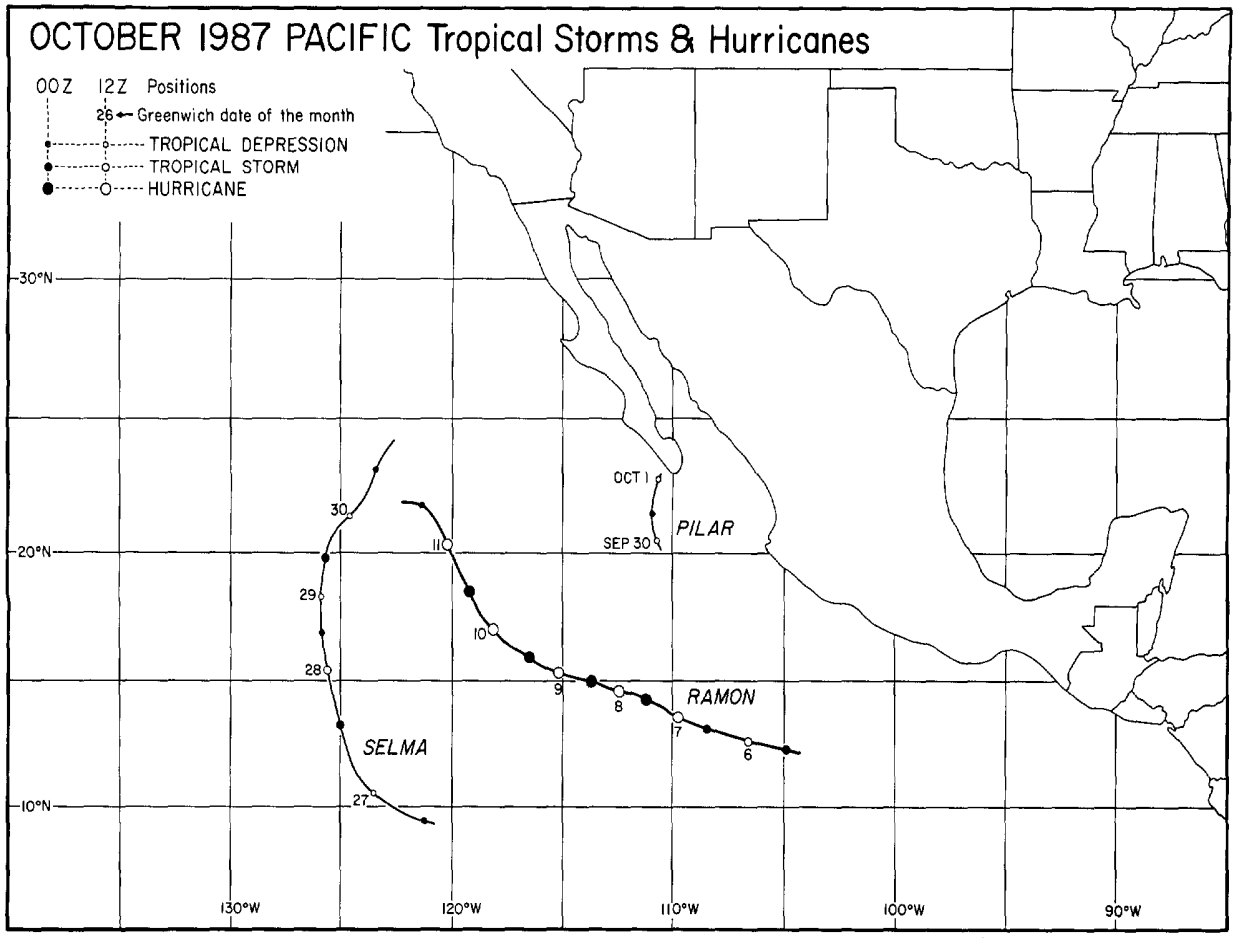
● 1AL	● 7DE	● 14KS	● 21MN	● 28NJ	● 33OH	● 39SD	● 44VA	● 49AK(SE)
● 2AZ	● 8FL	● 15KY	● 22MS	● 29NM	● 34OK	● 40TN	● 45WA	● 50HI
● 3AR	● 9GA	● 16LA	● 23MO	● 30NY(O)	● 35OR	● 41TX(N)	● 46WV	● 51PR
● 4CA(N)	● 10ID	● 17ME	● 24MT	● 30NY(C)	● 36PA(E)	● 41TX(S)	● 47WI	● 52VI
● 4CA(S)	● 11IL	● 18MD	● 25NE	● 30NY(W)	● 36PA(W)	● 41TX(W)	● 48WY	● 53PC
● 5CO	● 12IN	● 19MA	● 26NV	● 31NC	● 37RI	● 42UT	○ 49AK(N)	
● 6CT	● 13IA	● 20MI	● 27NH	● 32ND	● 38SC	● 43VT	● 49AK(S)	



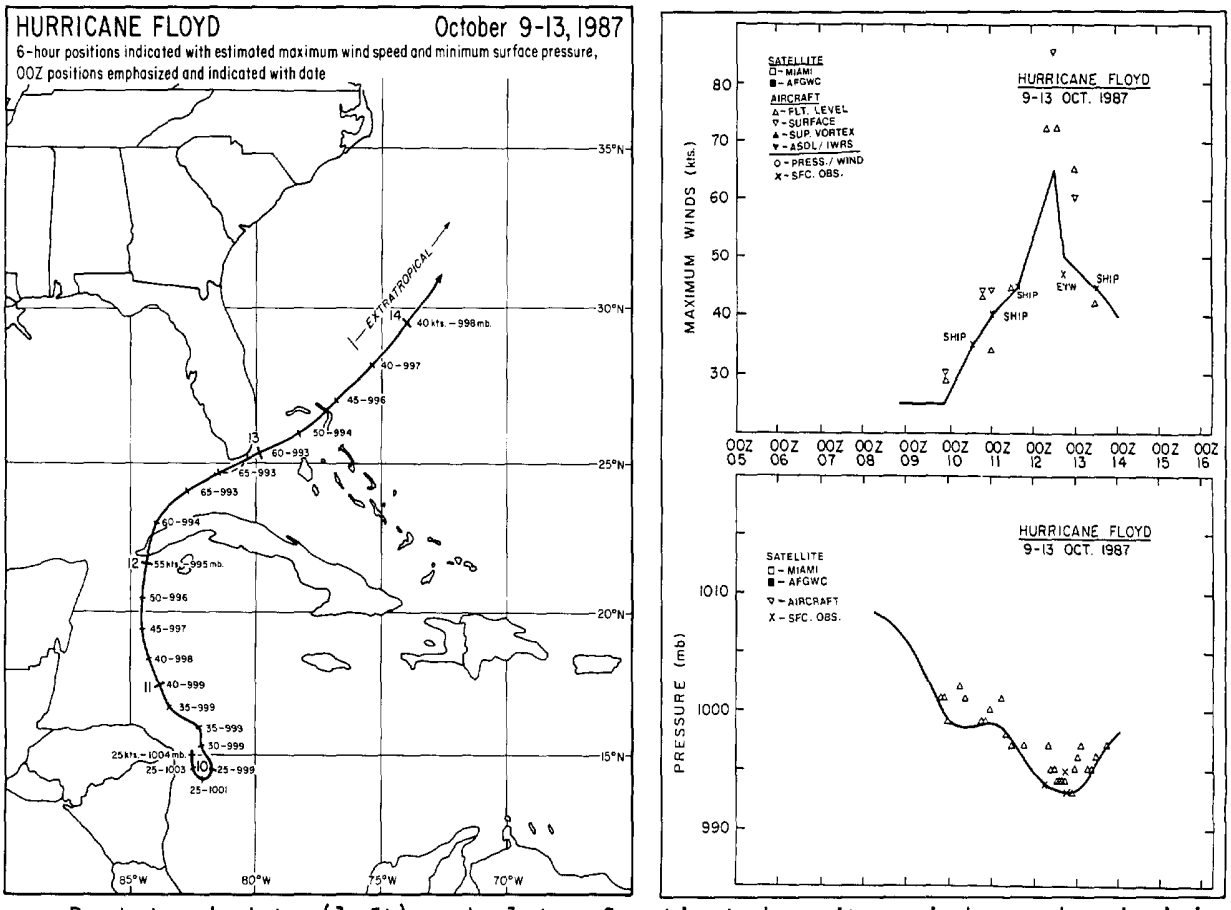


Mapped at the University of Chicago from NMC, 6-hourly surface maps


CYCLONE CENTRAL PRESSURE
OCTOBER 1987
6 HOURLY POSITIONS
UNKNOWN
≥1000 mb
980–999
960–979
940–959
<940
Mapped at the University of Chicago from NMC, 6-hourly surface maps

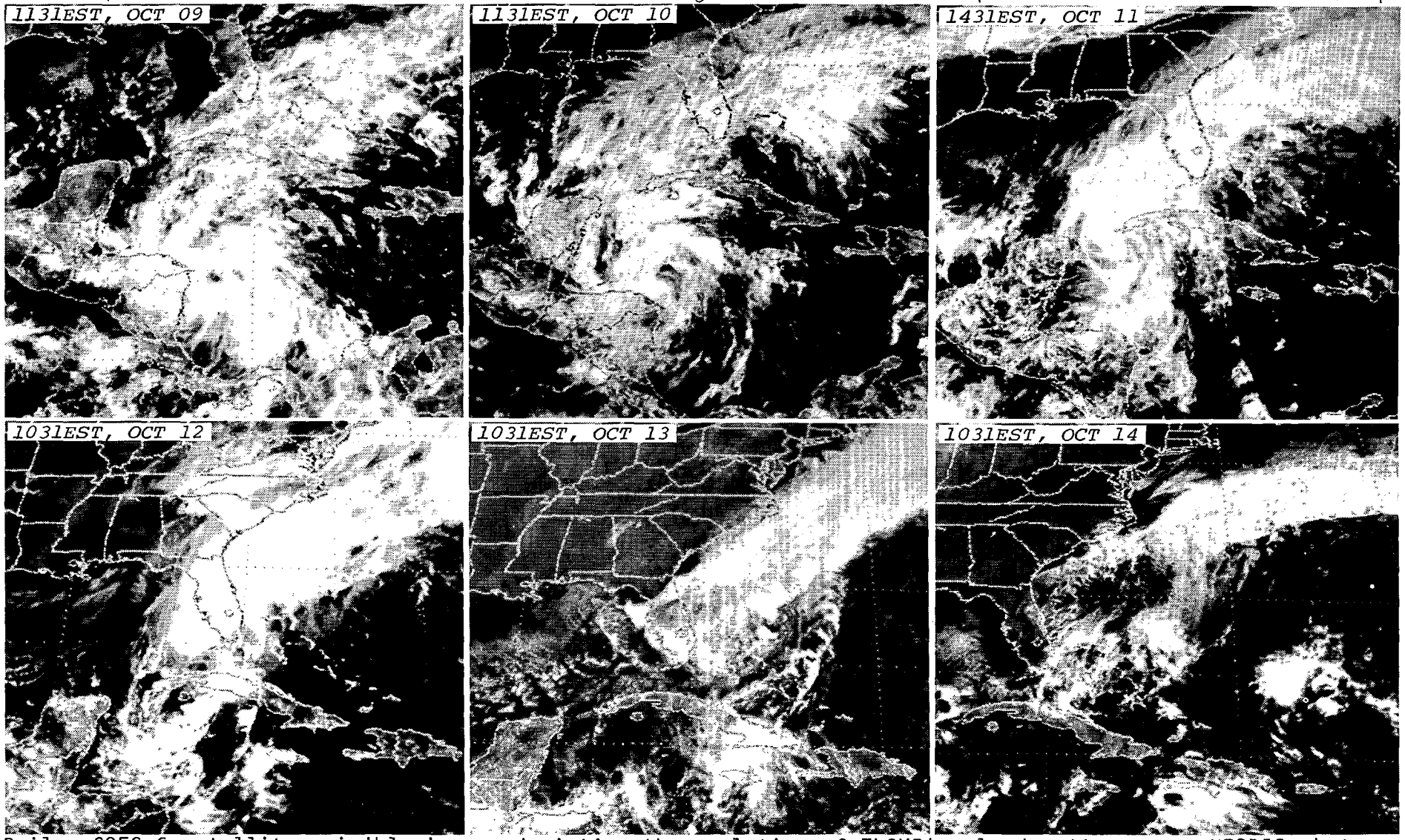


---Best track data from the NWSFO at San Francisco, California.



---Best track data (left) and plots of estimated maximum wind speed and minimum surface pressure versus time (right) for Hurricane FLOYD from NHC, Miami, Florida.

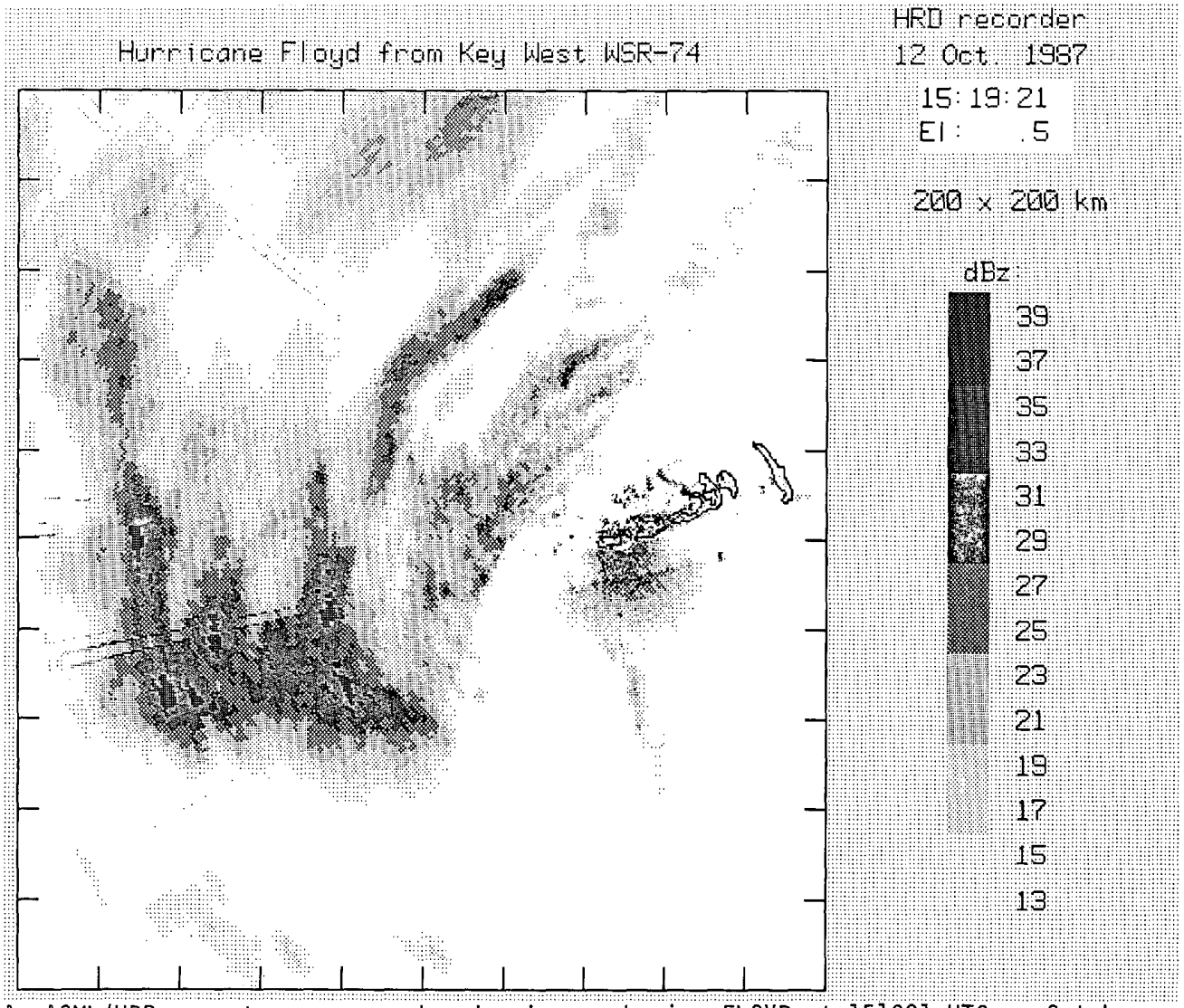
Hurricane FLOYD was the only Atlantic-basin hurricane or tropical storm during October 1987, and the only hurricane to make a landfall in the U.S. during the 1987 season, albeit a glancing blow through the Florida Keys. The storm formed in the Caribbean off the coast of Nicaragua on October 9th (see map on previous page) and moved northward, passing over the west tip of Cuba early on the 12th (UTC). FLOYD then attained minimum hurricane strength as it turned northeastward and moved through the Keys, after which it weakened and became extratropical as it moved out into the Atlantic. Damage was minor but widespread across Florida's south tip.



Daily, GOES 6 satellite, visible images depicting the evolution of FLOYD's cloud pattern. ---NESDIS photos.

LOCATION	STRONGEST WIND (KNOTS) DATE/TIME	SUSTAINED	PEAK	MIN.PRES.(MB) DATE	TIME	RAINFALL(INCHES) STORM TOTAL
FLORIDA						
WSO Key West	12/1849Z	N/40	58	12/1900Z	994.6	3.28
Duck Key	12/2157Z	N/51	61			
Conch Key				12/1900Z	992.6	
WSO Miami	12/1333Z	SE/30	33	12/2050Z	999.3	2.39
Miami Beach	12/2250Z	N/24	46			2.76
Natl.Hur.Cntr.	12/2139Z	N/31	35			
Ft.Lauderdale	12/2147Z	N/35				2.13
North Dade						3.98
Hollywood						2.97
Tamiami Arpt.						1.27
Homestead AFB						1.99
Clewiston						2.31
Naples						5.20
WSO Palm Beach	12/1755Z	N/27	43			2.92
Vero Beach			35			3.77
Kennedy Sp.Ctr.		19	30			2.94
Brevard CO		30	43			3.00
Patrick AFB		19	33			2.84
Melbourne FSS		22	32			3.10
Ft.Myers FSS	12/1253Z	22	44	12/1900Z	1002.4	4.83
WSO Tampa	12/1239Z	14	21	12/1900Z	1005.1	1.28

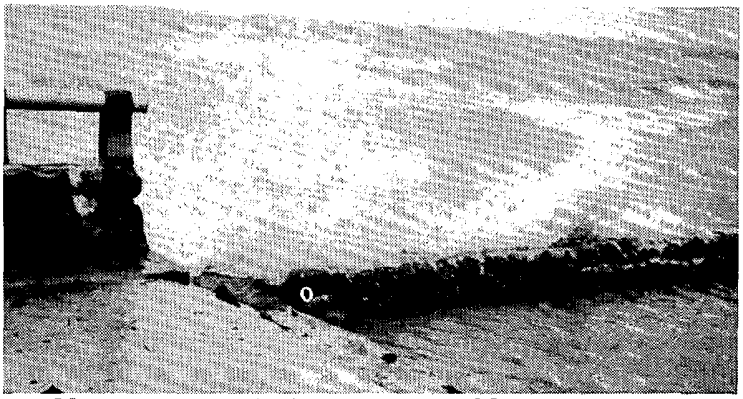
Selected meteorological and hydrological statistics for Hurricane FLOYD, October 1987.



An AOML/HRD computer-processed radar image showing FLOYD at 151921 UTC on October 12th. Original (pre-processed) data were collected from the NWS WSR-74 radar at Key West, Florida using HRD's land-based radar system. ---Figure from AOML/Hurricane Research Division, Miami, Florida.

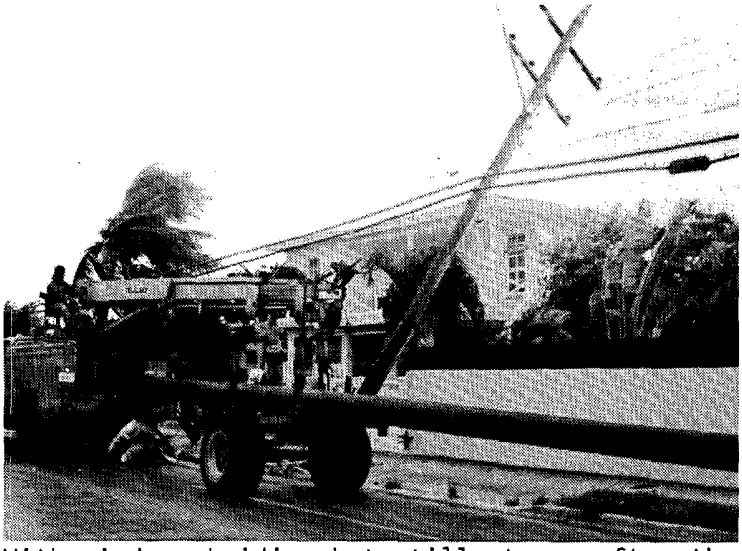
All photos on this and the following page were taken at Key West, Florida on October 12, 1987.

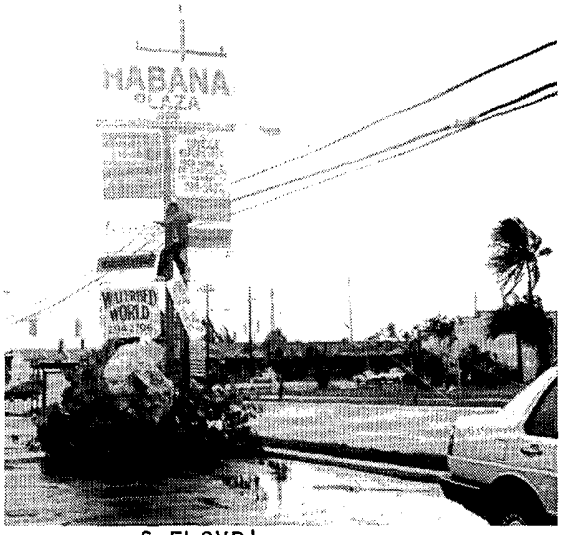
In anticipation of FLOYD's arrival, a Key West resident loads his van with just-purchased plywood early on the 12th. Last minute boarding-up was a popular early morning activity.



Small waves crash into a seawall on the south side of Key West about one hour before the arrival of FLOYD's eye. The storm's tides were generally insignificant, with the exception of the Florida Bay side of the middle keys where tides ran 3 to 4 feet above normal after the passage of FLOYD's center.

LEFT: Palm branches flex in FLOYD's winds about one and a half hours before the eye's arrival.





With winds subsiding but still strong after the passage of FLOYD's eye, power company workers already move in to right a tipped pole (left) and a man begins to remove temporary guy wires attached to a store sign for reinforcement (right).

Remains of a sidewalk canopy at a Key West department store after being partially dismantled by FLOYD's winds.

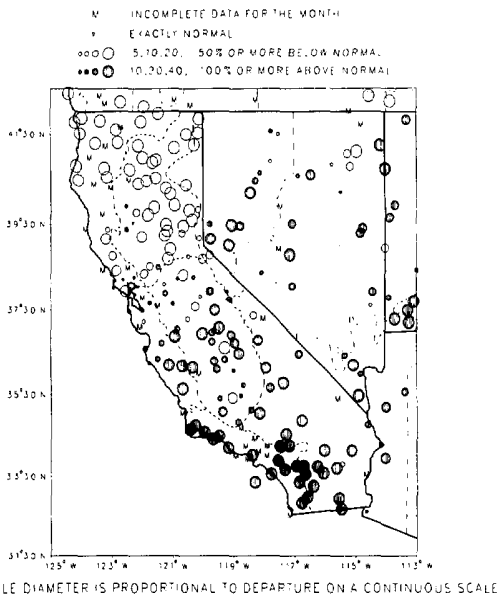
Uprooted trees on Key West, typical of many that were felled across the Keys and southern tip of Florida.

Key West residents use teamwork to remove a fallen palm tree from atop a car.

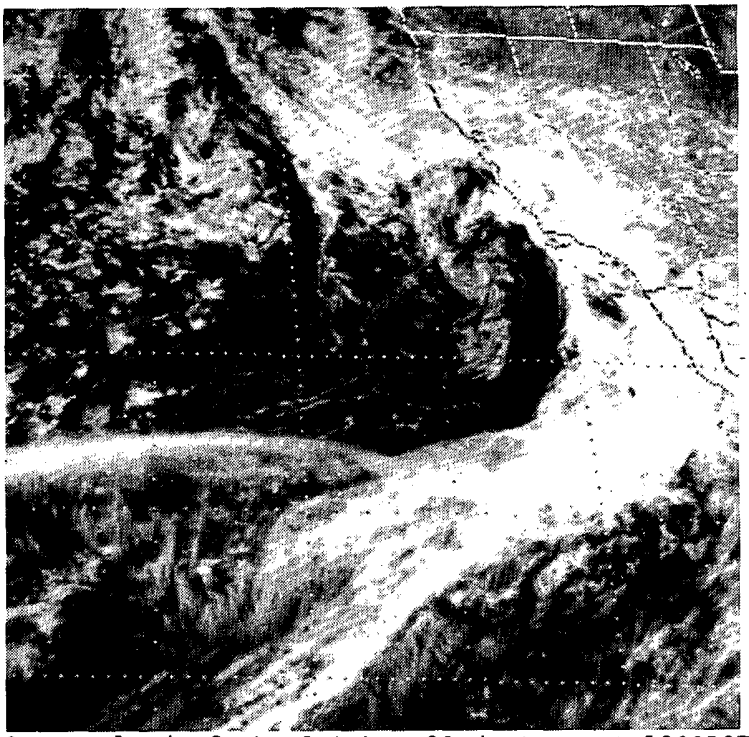
---All photos on pages 9 and 10 by Jan Hebdon, The Key West Citizen.

2. HEAVY RAINS in SOUTHERN CALIFORNIA on October 22 and 31, 1987

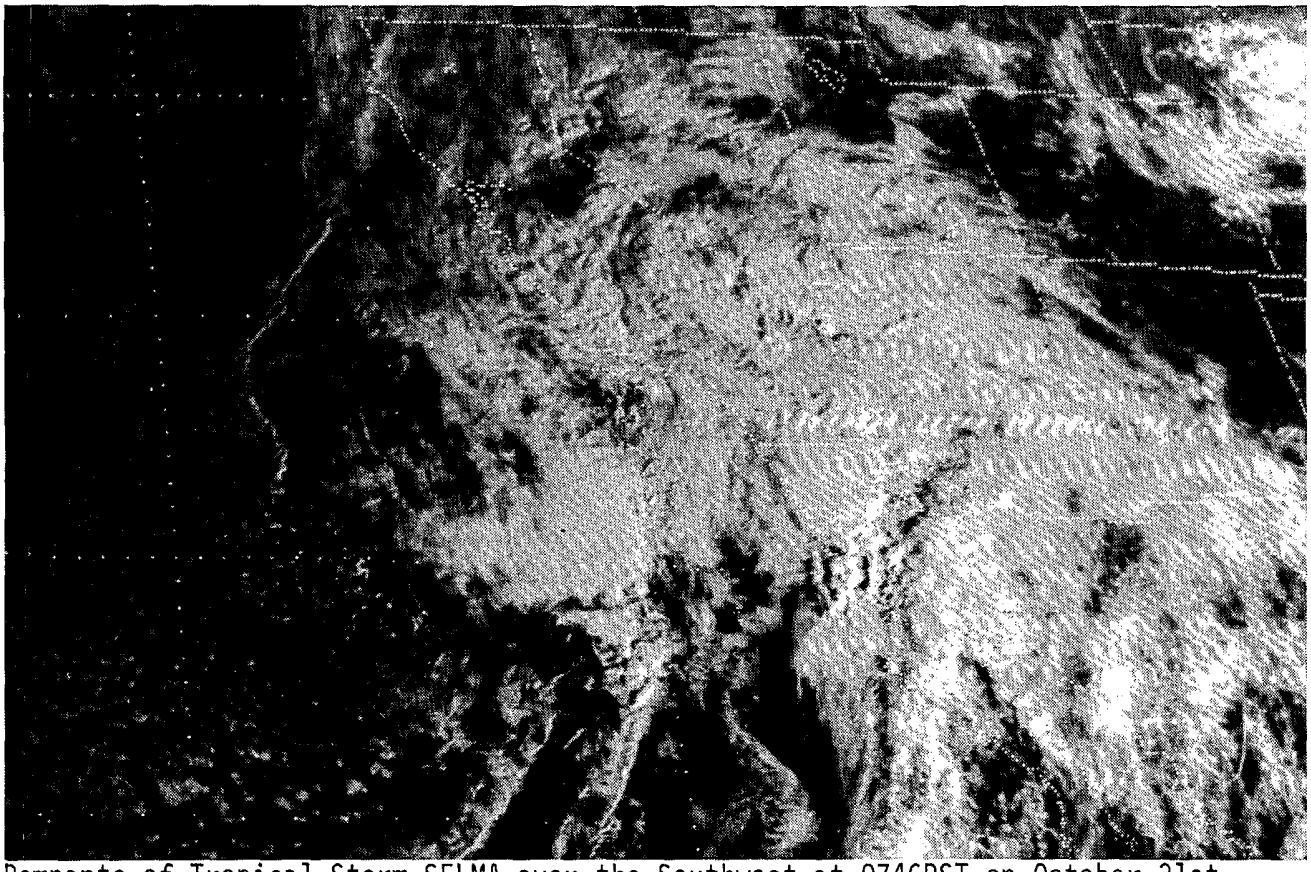
October 1987 was an unusually wet month for Southern California, with most recording stations receiving precipitation amounts well in excess of normal (see map below). In contrast, Northern California had far less than normal precipitation. The heaviest rains, which resulted in mudslides, widespread flooding, and numerous traffic accidents, were produced by two storm systems, a cut-off low that formed off the coast on October 22nd and the remnants of Tropical Storm SELMA which moved through on the 31st.



---Map from Climatological Data.



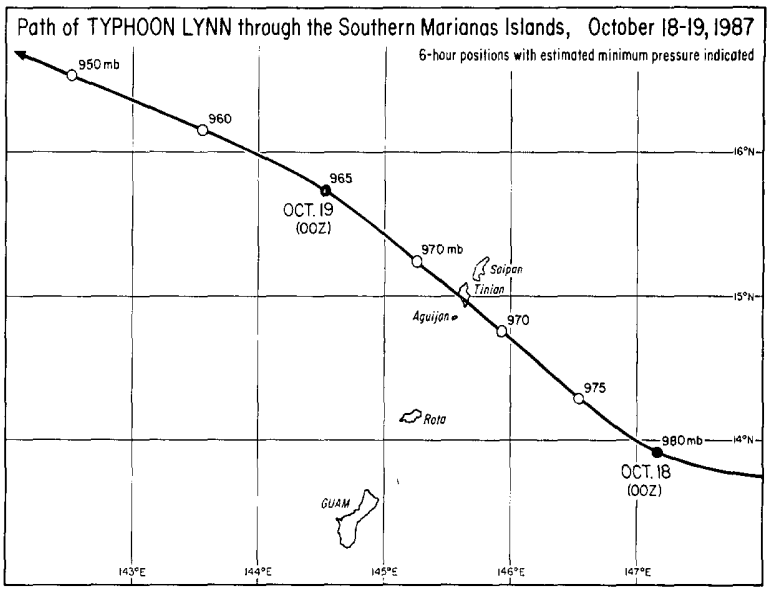
Comma cloud of the October 22nd storm at 1200PST.



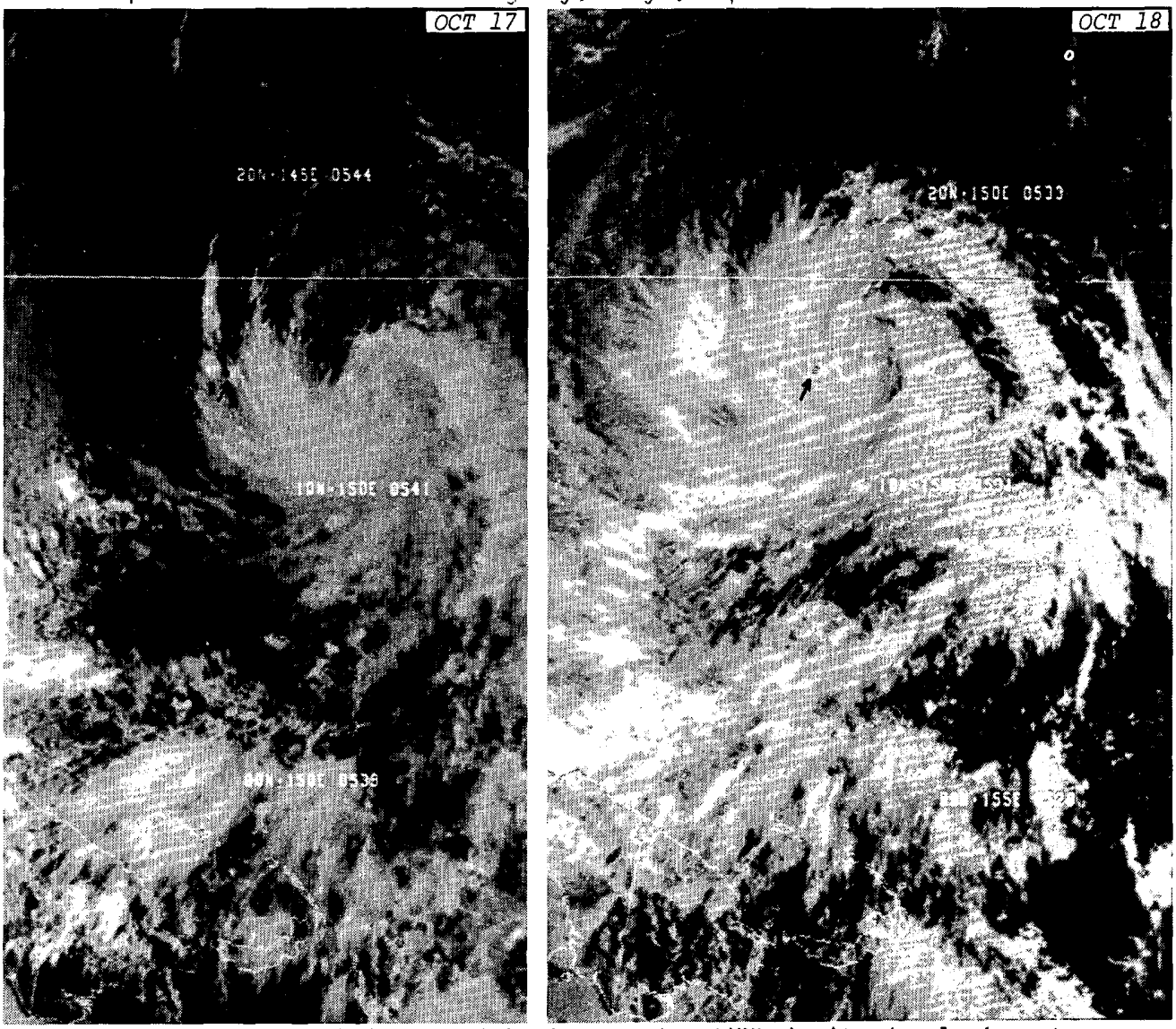
Remnants of Tropical Storm SELMA over the Southwest at 0746PST on October 31st.
---Both photos are GOES 6 satellite, visible images, courtesy of NESDIS.

3. TYPHOON LYNN in the WESTERN PACIFIC, October 16-28, 1987

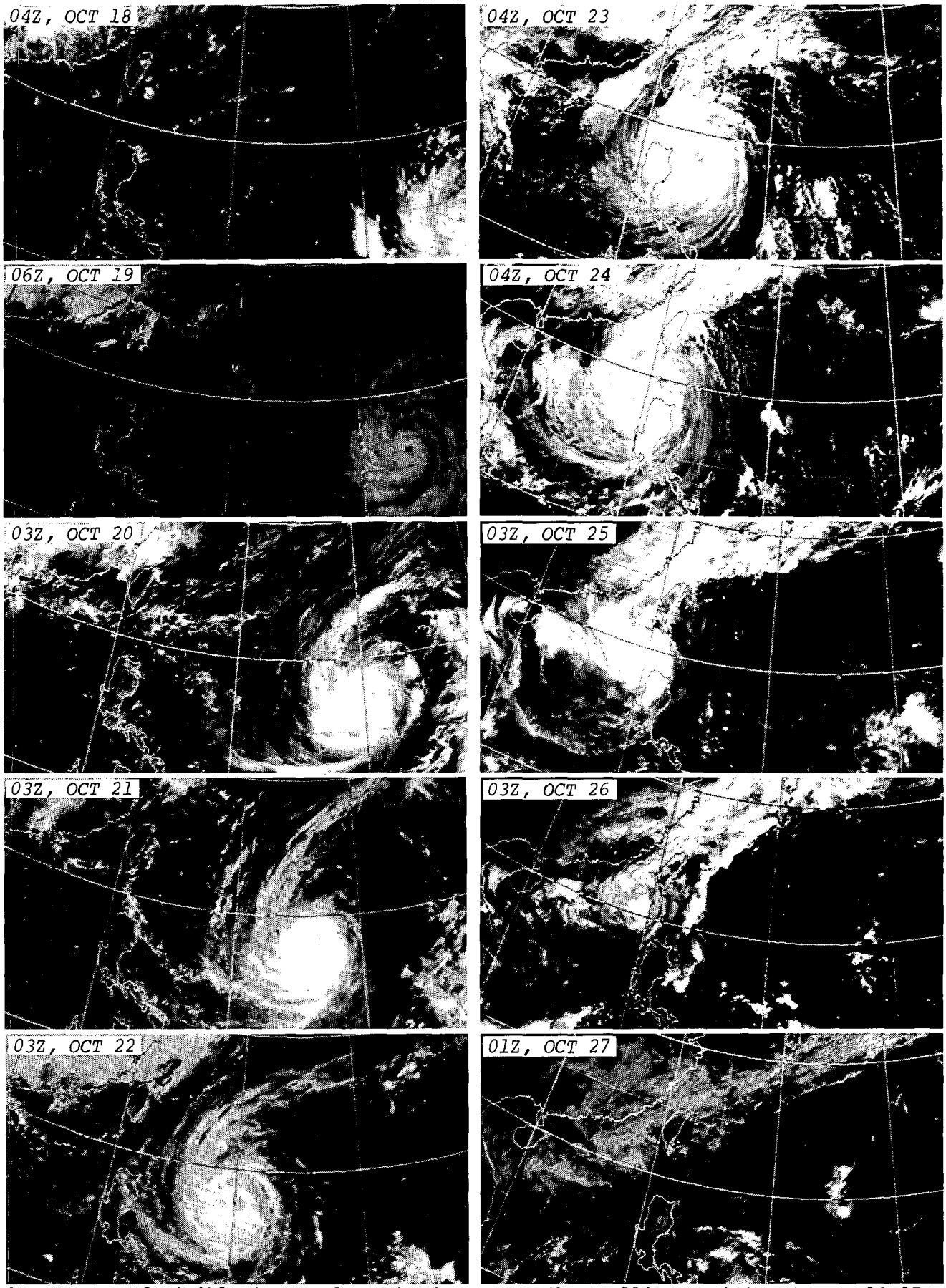
Traveling on a west-northwest course across the western Pacific Ocean from October 16th to the 28th, Typhoon LYNN passed directly over the northernmost of the large islands that comprise the south half of the Marianas Chain. Overnight on the 18th and 19th, winds gusting to 65 mph were experienced on Guam, 85 miles south of the storm's center, while Saipan, Tinian and Rota had gusts that neared 100 mph. On Saipan, two persons were injured by flying glass and 200 people spent the night in shelters. Several wooden structures were blown over, and damage to power lines and crops was widespread.



---Best track data from the Japan Meteorological Agency, Tokyo, Japan.



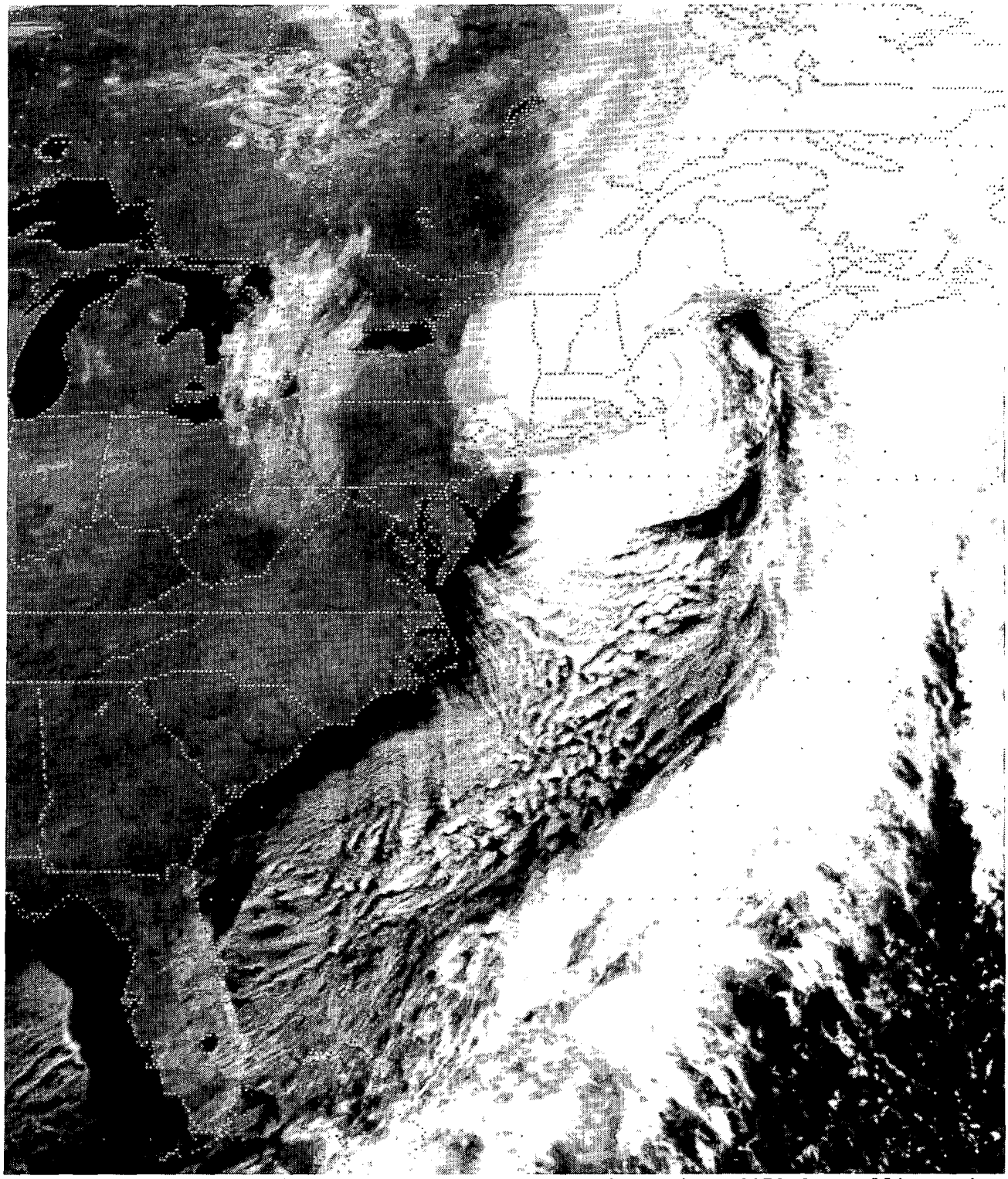
NOAA polar-orbiting satellite, visible images show LYNN in its developing stage as it approached the Marianas Islands on October 17th and 18th. Guam (arrow) and satellite zenith positions with time (UTC) are indicated. ---Photos from NESDIS.



A sequence of visible images from the Japanese GMS satellite positioned over 135°E longitude shows the evolution of Typhoon LYNN's spiralling cloud mass as the storm moved westward from the Marianas, between Taiwan and the Philippines, and into the South China Sea where it weakened and dissipated. ---Photos from NESDIS.

4. SNOWSTORM in the NORTHEAST on October 4, 1987

On October 4th, a coastal storm in the Northeast broke records by dumping heavy, wet snow over eastern New York, Vermont, and western portions of Connecticut and Massachusetts. Up to 12 inches of snowfall in Connecticut and Massachusetts won the storm the title of being the heaviest early-season snowstorm of the century there, while it was the earliest snow for a season on record in eastern New York. Throughout the four state area, the snow brought down power lines, resulting in a loss of electricity to about 333,000 customers, and an untold number of trees and tree limbs that were still in full leaf. Many vehicles were damaged by the falling trees and limbs, and many weather-related traffic accidents resulted in death and injury.



The Northeast snowstorm's giant comma cloud as depicted in a GOES 6 satellite, visible image taken at 1131EST on October 4, 1987. ---Photo from NESDIS.

STORM DATA AND UNUSUAL WEATHER PHENOMENA

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS KILLED	NO. OF PERSONS INJURED	ESTIMATED† DAMAGE PROPERTY	ESTIMATED† DAMAGE CROPS	CHARACTER OF STORM
1 ALABAMA — NONE REPORTED									
2 ARIZONA									
Maricopa County Wickenburg	24	1800			0	0	3	?	Flash Flood
	Sudden downpours of about 1/2 inch in 15 minutes struck extreme northern Maricopa County. Police reported washes running at least two feet deep and roads closed due to flooding in town. Small hail fell at the Wickenburg Airport.								
Maricopa County Wickenburg	29	1450			0	0	6	?	Hail (1.75) Thunderstorm Wind Flash Flood
7N Carefree	29	1600			0	0	2	0	Funnel Cloud
15NW Buckeye	29	1630			0	4	5	?	Thunderstorm Wind
Luke AFB	29	1645			0	0	?	0	Thunderstorm Wind (70kt)
Glendale Airport									Thunderstorm Wind (75kt)
Litchfield Park	29	1652			0	0	4	?	Hail (1.25)
Phoenix	29	1654			0	0	5	0	Thunderstorm Wind (59kt)
Gila Bend	29	1700			0	0	5	?	Thunderstorm Wind
	Two areas of severe thunderstorms developed rapidly over western Maricopa County. The first, near Wickenburg, moved to the northeast. Large hail, strong and damaging winds accompanied the heavy rains in that town. The second one formed further south, and moved to the east-northeast. Extensive damage, mostly from wind and hail was reported from these storms. Large hail up to ping-pong ball and baseball size, accompanied them. Widespread power outages occurred as approximately 126 power poles were downed. About $2.5 million in damages was reported by Arizona Public Service alone. Sixteen people were trapped in Scottsdale when power lines fell on their cars. A few minor injuries occurred at the Arizona State Fair as tents collapsed. Vehicles were blown off I-10 west of Phoenix, and at least one airplane was flipped at the Litchfield Airport. About nine mobile homes and two houses near Tonopah were damaged or destroyed. Four people suffered minor injuries. The Gila Bend area was also hit hard. The wind blew off a portion of a metal roof at the sheriff's office and two antennas were damaged.								
3 ARKANSAS									
Dallas County	26	0430CST			0	0	6	0	Lightning
	Lightning struck a frame-making factory at Fordyce. The ensuing fire caused extensive damage to structures and contents. About one million dollars in inventory were destroyed.								
4 CALIFORNIA, Northern — NONE REPORTED									
4 CALIFORNIA, Southern									
CAZ-011-012 015-016-017 020	3	2 days			0	0	?	?	Extreme Heat
	Observations from around the Los Angeles Basin were near 100 degrees for two days in a row. The extreme heat caused no major difficulties. One hundred and eight (108) degrees was the reported maximum on the 3rd and the 4th. These were two (2) degrees short of the all time record maximum temperature (110).								

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS KILLED	NO. OF PERSONS INJURED	ESTIMATED† DAMAGE PROPERTY	ESTIMATED† DAMAGE CROPS	CHARACTER OF STORM
CALIFORNIA, Southern									
CAZ-011-012 013-015-016 017-020 Coastal and Mountain Areas	11	all day			0	4	3	1	Heavy Rain
	Heavy rain throughout Southern California produced street flooding along the coast, dozens of traffic accidents through all areas, and mud slides in the burn areas of the mountains. At 1030 lst, a vehicle spun out of control and hit an automobile on the Costa Mesa Freeway (SR-55) near Dyer Road in Santa Ana. At 1430 lst, three people were injured in a two car accident. The vehicles were on the Riverside Freeway (SR-91), west of Imperial Highway, when the first vehicle spun out of control, crossed the median strip and collided, with the second vehicle.								
CAZ-017-020 San Diego and Orange Counties	12	all day			0	0	2	?	Heavy Rain
	Rain continued through Monday evening. The roof of the Ramona Library began to leak and books were covered for protection. Several streets in Southern Orange County were closed due to high water in the roadway. A Flash Flood Watch was issued for Sunday night.								
CAZ-011-012 013-015-016 017-020	22	all day			2	10	6	?	Flash Flood
	A strong cut-off low formed off the coast of Southern California. Rainfall totals were near one (1.00) inch in the coastal areas, with amounts of two (2.00) or more inches in the mountains and foothills. Santiago Peak registered 3.43 inches. In Mission Viejo, a tree fell and blocked Goleta Street. Mudslides were reported throughout the day in Mission Viejo and Rancho Santa Margarita. The rain produced a torrent of water over 35 feet high in the Yuima Creek in northern San Diego County. The wall of water flowed down the southwestern slopes of Palomar Mountain. Four homes were evacuated near the Rincon Indian Reservation. The Yuima Municipal Water District office was nearly destroyed by the torrent of water. Additionally, the Wildlife Way Station in the Los Angeles National Forest was damaged by heavy rain. Four vehicles and a horse trailer were covered by mud, and a bridge was severely damaged. A mudslide near La Canada closed six (6) miles of the Angeles Crest Highway. In Brea at 1400 lst, a woman lost control of the car she was driving and collided with a pickup truck. The woman died at the scene, the driver of the pickup and his passenger sustained injuries. Six people were injured in a six car pile-up on the San Diego Freeway (I-5) near Lake Forest. A truck turned over on the Orange Freeway (SR-57) and a tractor trailer rig turned over on the Garden Grove Freeway (SR-22). Later in the evening a man lost control of his car and ran into a truck on the Del Amo Boulevard on ramp to the San Gabriel River Freeway (I-605) in Lakewood. F60V, M56V. Seventy (70) people were forced out of three apartment buildings in Hollywood and Downtown Los Angeles. Rain water poured through roofs and walls damaged by the October 1st earthquake. At 1600 lst, a Highway Patrol Officer stopped to assist disabled motorists on the Golden State Freeway (I-5) below the Lankershim Boulevard overpass. The embankment gave way and surrounded the cruiser. The freeway was closed until Friday night. Damage estimated at one million dollars. Almost 200,000 people were without electricity during the storm, All power was restored by late Friday. Damage to the power lines and poles was estimated to near $750,000. The heavy rains inundated the sewers at the Hyperion Water Treatment Plant near El Segundo. The station overflowed sending 2.7 million gallons of partially treated sewage into Ballona Creek and Santa Monica Bay. There was also a 30 thousand gallon overflow of untreated sewage from Pacific Palisades. Some rainfall totals for selected areas: Station — Rainfall Big Bear — 0.85 inches Fontana — 1.01 inches San Bernardino — 1.25 inches Chino — 1.30 inches Yucaipa — 1.75 inches Crestline — 2.75 inches Santiago Peak — 3.43 inches Crestline — 2.75 inches Blue Jay — 5.00 inches								

STORM DATA AND UNUSUAL WEATHER PHENOMENA

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

CALIFORNIA, Southern

CAZ-011-012 013-015-016 017-020	31	All day			3	25	6	3	Heavy Rain

Moisture from an old tropical storm (SELMA) flowed into Southern California and combined with a cold front off the coast. Heavy rain caused numerous mud slides. Three rock slides occurred in the area of Soledad Canyon Road, one mile west of Acton. The road was closed but no injuries were reported. A rock slide blocked the on ramp to the Antelope Valley Freeway (SR-14) between Acton and Canyon Country.

All the deaths were traffic related. The driver of one car lost control while driving on Pearblossom Highway at 1330 lst. He was killed upon striking an oncoming vehicle, injuring the other driver. Traffic M30V.

In the afternoon, a head on collision on the Sierra Highway killed one person. The car began to hydroplane and struck an oncoming car. Five people were injured and one person was killed. Traffic M15V.

During the evening, a woman was killed when the car she was driving slid through a traffic light at the intersection of Figuero Street and 42nd Street. The car collided with five other vehicles. The passenger of her car and five people in a van she struck were injured. Traffic F31V.

The injuries were all due to weather related traffic accidents. Between 0730 lst and 1000 lst, there were three accidents on the Santa Ana Freeway (I-5) between Garfield Avenue and Washington Boulevard. A total of ten (10) people were injured during these accidents. Nine (9) people were injured in a multi-vehicle accident on the Harbor Freeway (I-110) near Carson Boulevard (1200 lst).

Water flooded the Pacific Coast Highway (SR-1) near Malibu. The water stood hubcap deep (approximately seven to nine inches) at several locations. Standing water was reported on the Ventura Freeway (US-101) in the San Fernando Valley. There were no reports of damage from the water.

Rain blocked the sewage tunnels of the Hyperion Water Treatment Plant in El Segundo, causing over four (4) million gallons of partially treated sewage to overflow into Ballona Creek and Santa Monica Bay. Beaches were closed from Zuma to Long Beach as a precaution.

Early on November 1st, two men, one wearing a pink ballerina's costume, were rescued from the top of a car. The Car got stranded after they tried to cross the Los Angeles River near Griffith Park. During the early morning, a 13 year old surfer ventured into the rain-swollen Los Angeles River to "catch a wave" but got stuck in debris.

5 COLORADO

Pueblo County COZ 016	13	2120			0	0	5	0	Lightning

Lightning struck an electrical power transformer in Pueblo, starting a fire that caused $75,000 damage to a trailer and auto salvage equipment.

Jefferson, Douglas Counties COZ 011	13-14				0	0	0	0	Heavy rain

Rain drenched the Platte Canyon area southwest of Denver. 1.11 inches fell at Kassler in Jefferson county, with 1.49 a few miles upstream at Strontia Springs.

6 CONNECTICUT

CTZ001-004, Interior western portion	04	All day			2	2	5	7	Heavy snow

A record breaking early season snowstorm caused widespread electrical power losses affecting up to 85,000 customers statewide and resulted in two deaths. Snowfall amounts ranged from around one inch along the coast from Bridgeport to Norwalk to 7 inches in Danbury up to 12 inches in extreme northwest CT. About 70% of the power losses occurred in upper Fairfield county especially in the towns of Danbury, Ridgefield and Bethel. Trees, in full leaf and some with colorful autumn foliage, were heavily damaged by the heavy, wet snow. In Canaan, a tree heavily laden with snow resulted in the deaths of two people and injuries to two others when a large limb fell on a car traveling along Route 7. Many parked vehicles and some homes were damaged by falling tree limbs throughout the entire area. Restorstion of electric service took up to three or four days in hardest hit areas as out-of-state lineman were called in to assist local crews. A coastal low pressure system moved north-northeastward through Rhode Island and central Massachusetts while a pool of unusually cold air aloft between fifteen and twenty thousand feet moved southward to the west of this low pressure system. Some other snowfall amounts included about an inch and a half in the Hartford area, one inch at New Haven, and twelve inches at Sharon. This storm broke many records set rather recently on October 10, 1979, when many areas received around 6 inches of snowfall. Agricultural losses were reported to be minimal. M39V, F71V.

7 DELAWARE — NONE REPORTED

8 FLORIDA

Monroe County, Cudjoe Key	01	0200EST			0	0	0	0	TSTM Wind (53)

A wind gust of 53 knots was recorded at the Air Force station.

Monroe County, Key Largo	11	2115EST	short	narrow	0	0	5	0	Waterspout-Tornado (Fl)

Preceding the passage of Hurricane FLOYD, a waterspout-tornado moved on shore in Rock Harbor Estates on Key Largo, causing damage to several boats, mobile homes, trees and power lines, and minor damage to a few houses.

South Florida and the Keys	12	0700-2100EST			0	0	5	0	Hurricane

Hurricane FLOYD moved east-northeast along the Florida Keys and passed south of Miami during the evening as a disorganized and weakening storm. Wind up to 51 knots was recorded at Duck Key, and most of the Keys reported 40 to 50 knot winds. Over south Florida, wind of 30 to 35 knots with gusts of 40 to 50 knots was reported. Rainfall of 2 to 4 inches was reported across southern Florida, with a band of 5 to 9 inches from Naples to Lake Okeechobee to Fort Pierce. Rainfall of near one inch was observed through the Keys. Trees and power lines were downed in several areas of south Florida and the Keys. A ship off the Dade and Broward county coasts listed to 40 degrees and was abandoned.

9 GEORGIA — NONE REPORTED

10 IDAHO

Most of Idaho	1-31				0	0	0	0	Drought
Boise, Custer, Blaine and Elmore counties: Frank Church River of No Return Wilderness	3- 4				0	0	5	0	Cold Front

Cold front winds caused the Deadwood fire to blow-up, burning 10,000 additional acres. The Deadwood fire was started by lightning on August 3 or 4 and allowed to burn naturally. Drought conditions contributed to the blow-up.

STORM DATA AND UNUSUAL WEATHER PHENOMENA

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

IDAHO

Teton and Bonneville counties; Targhee National Forest	3- 4				0	0	5	0	Cold Front
	Cold front winds caused a 1,000 acre major run on the Spring Canyon fire. Drought conditions were noted in the area.								

11 ILLINOIS — NONE REPORTED

12 INDIANA — NONE REPORTED

13 IOWA

SDZ018-IAZ001-002-003-004-005-006-007-008-009-010-011-014-015-ILZ004 Most of Iowa	01- 02	1200 CST 0600 CST			0	0	4	7	High Winds
	Strong winds gusting to between 45 and 60 MPH occurred over most of Iowa. These winds were the result of a strong low pressure system to the Northeast of the state. There were numerous reports of trees being blown over. Scattered damage to buildings was also reported. Much of the dollar damage in the state was to crops. The strong winds resulted in a considerable amount of lodging to corn and soybean crops.								

14 KANSAS

Barton Co Pawnee Rock	30	2300CST			0	0	4	0	Lightning
	Lightning struck a home in Pawnee Rock. A fire resulted that destroyed the house and much of its contents.								
Sedgwick Co Wichita	31	0730CST			1	1	0	0	Lightning
	Lightning struck and killed a football coach as he walked across a football field in south Wichita. A boy walking beside him received minor injuries from the strike but did not require hospitalization. M360.								

15 KENTUCKY — NONE REPORTED

16 LOUISIANA

Claiborne Parish	18	2030CST			0	0	3	0	TSTM wind
	Thunderstorm wind gusts ripped the porch off a mobile home and tore limbs off a tree near Ruple.								
Caddo Parish	26	0315CST			0	0	?	0	Hail (1.00), TSTM wind
	Quarter size hail fell near Rodessa and thunderstorm winds toppled trees near Ida.								
Caddo Parish	26	0320CST			0	0	0	0	Hail (0.88)
	Nickel size hail fell near Dixie.								
Bossier Parish	26	0325CST			0	0	0	0	Hail (1.00)
	Quarter size hail fell at Alden Bridge.								
Lincoln Parish	26	0500CST			0	0	4	0	TSTM wind
	An old oak tree was toppled by thunderstorm wind gusts in Sibley; about 25 miles west of Monroe. The tree fell onto a house severely damaging half of the structure.								
Calcasieu Parish	26	1055CST			0	0	0	0	Hail (0.75)
	Dime size hail was reported by a National Weather Service employee 5 miles northwest of the Lake Charles Airport.								

17 MAINE — NONE REPORTED

18 MARYLAND and D.C.

Prince Georges Co	1	1100EST			0	2	3	0	High Wind
	Brisk northwest winds collapsed a townhouse frame, injuring two workers. National Airport recorded a peak gust of 27 knots at 1327EST.								
Prince Georges Co	6	2330EST			1	2	0	0	Lightning
	Lightning struck three people walking through a parking lot. A 26 year old man was killed, and two women, aged 25 and 27, were injured. M260								
MDZ001 Eastern MD	11	2243EST			0	0	6	0	Sustained Winds
	A cold front brought brisk northwest winds throughout the mid Atlantic area. The winds, averaging 20 to 25 knots, helped fan a fire that caused extensive damage in Crisfield.								

19 MASSACHUSETTS

Nantucket county	01	1600EST			0	0	4	0	Lightning
	A bolt of lightning badly damaged the oldest house on Nantucket built in 1686. The house, known as the Jethro Coffin House, is a registered national historic landmark. The lightning went down the chimney and, incredibly, blew the house apart. Sixty percent of the house was destroyed. The house will have to be rebuilt using as many pieces of the original wood as possible.								
MAZ006, Berkshire county	04	All day			1	1	5	4	Heavy snow
	The heaviest early season snowstorm of the century deposited up to a foot of heavy, very wet snow at the highest elevations in the county and 9 inches in Pittsfield, 10 inches at Williamstown, 8 inches at North Adams, and 6 inches at Lenox. Up to 18,000 electric customers lost power as falling tree limbs brought down electric lines throughout the area. Some remained without power for several days following the storm. A man was killed and his friend injured when they came in contact with a live electric wire knocked down by the storm in North Adams. Many local streets were blocked by tree limbs and snow and the Massachusetts Turnpike was closed for seventy miles from the New York state line east. Property damage was the result of falling tree limbs striking homes and autos. Numerous fall foliage viewers were stranded by the storm and a hiking party on the state's highest mountain, Mt. Greylock, had to be rescued by snowmobile. Although it was not devastating to agriculture, 35,000 acres of silage corn was flattened by the snow throughout the county. The culprit for this rare storm which even was accompanied by thunder and lightning was a coastal low pressure system which moved north-northeast through Rhode Island and east central Massachusetts. A heavy moisture supply with this system combined with a very unusual cold pool of air aloft between fifteen and twenty thousand feet to produce this rare event. M190.								

20 MICHIGAN — NONE REPORTED

21 MINNESOTA

MNZØØW-ONE	01	1300CST			0	0	4	0	High Wind
	Winds from a storm system centered northeast of Thunder Bay, Ontario blasted into northwest Minnesota during the early afternoon. Damaging winds spread into southwest Minnesota then continued into the evening. Winds reached 58 miles per hour at Thief River Falls shortly after 1300CST and flipped a small aircraft. Wind gusts reached 70 miles per hour near Hallock in Kittson County, 58 miles per hour around Park Rapids between 1500 and 1800CST and 70 miles per hour in Duluth at 1531CST. Sustained winds of 47 miles per hour were measured in Marshall at 1700CST. Many trees and limbs were knocked down causing power and phone outages. Shingles were torn off roofs and some sheds were blown down.								

STORM DATA AND UNUSUAL WEATHER PHENOMENA

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

22 MISSISSIPPI — NONE REPORTED

23 MISSOURI — NONE REPORTED

24 MONTANA — NONE REPORTED

25 NEBRASKA — NONE REPORTED

26 NEVADA

Storey County	23	1640PST			0	0	0	0	Funnel Cloud

A short-lived funnel cloud was reported by a pilot about 15 miles east-northeast of Reno.

Clark County	24	0200-2200PST			0	0	2	0	Urban Flooding

Light to moderate rain fell across southern Nevada throughout the day creating local street-flooding problems in and around Las Vegas in areas that characteristically have drainage problems. Numerous intersections around town were barricaded due to water running above the curbline. There were no reports of major damage or inundation.

27 NEW HAMPSHIRE — NONE REPORTED

28 NEW JERSEY, Northern

Bergen Co.	28	Morning			0	0	0	0	Flood

Very heavy rains caused the Saddle River near Lodi to overflow. Only very minor flooding was reported.

28 NEW JERSEY, Southern

Salem County									
Carneys Point	7	0054 EST			0	0	3	0	TSTM Wind
Salem City	7	0107 EST			0	0	3	0	TSTM Wind

Thunderstorm winds brought large trees down in Carneys Point and large limbs down in Salem City.

Atlantic County									
Ventnor	7	0150 EST			0	0	4	0	TSTM Wind

Thunderstorm winds brought trees down and destroyed Hobie Cat boats on the beach.

Camden County									
Audubon	7	0200 EST			0	0	3	0	TSTM Wind

Thunderstorm winds uprooted trees and brought down large limbs. The winds also took the sign off a laundromat. The damage was in an area 1/2 mile long and 2 blocks wide.

Burlington County									
Marlton	7	0210 EST			0	0	?	0	Hail(1.75)

Hail the size of golf balls was reported.

29 NEW MEXICO — NONE REPORTED

30 NEW YORK, Coastal — NONE REPORTED

30 NEW YORK, Central

Area Wide	04	0700EST	--	--	14	322	9	7	Snow Storm

The earliest snow on record fell over Eastern New York. Major power outages affected over 200,000 homes. Hardest hit areas were Dutchess, Ulster, and Columbia Counties. Some areas were without power for nearly two weeks.

The weight of the wet snow resulted in downed power lines, trees, and seven major power transmission towers. For most areas the entire grid system had to be rebuilt.

Local apple and fruit growers saw most of their crops ruined when trees could no longer bear the weight of snow and fruit. State officials placed farm losses at over 17 million dollars. Feed crops were affected most with over 10 million dollars in damage to corn silage losses.

Albany, Columbia, Rensselear, Dutchess, Greene, and Montgomery Counties were declared disaster areas.

Six persons were stranded on top of Hunter Mountain overnight; the sudden snow made it impossible for them to walk down the mountain.

Killed during the storm:
- M-50-V Dutchess County (poor visibility)
- M-47-O Albany County (hit and run during poor visibility)
- M-49-V Columbia County (crushed by falling tree)
- M-19-V Orange County (emergency vehicle crash)
- F-37-V Ulster County (poor road conditions during storm)
- M-46-V Columbia County (crushed by falling tree on car)
- M-47-O Albany County (hit by car, avoiding down tree)
- M-73-V Saratoga County (car accident)
- M-66-O Albany County (heart attack/shoveling snow)
- M-2 1/2 months-O Renns County (accidental asphyxiation)
- F-23-O Dutchess County (fire death)
- M-05-O " " " "
- F-03-O " " " "
- M-02-O " " " "

30 NEW YORK, Western — NONE REPORTED

31 NORTH CAROLINA

Wake Co. 4 N RDU Airport	06	2:25EST			0	0	?	0	Hail(1.75)

There were numerous reports of half-inch hail, and one report of golfball size hail as thunderstorms moved through the Triangle Area.

Statewide	All Month				0	0	?	?	Dry Weather

Prolonged dry weather began to take its toll once again on North Carolina. Some areas of the state had not experienced a good rainfall since early September. By the end of October there were increased forest fires in western NC, and some towns were running short on water supplies.

32 NORTH DAKOTA

NDZ005-010-00E Eastern and North Central ND	01	Afternoon and Evening			0	0	4	0	High Winds

Strong northwesterly winds, with gusts to 60 mph, downed trees and power lines, causing some power outages over the area.

The winds also blew over a small trailer near Drayton (Pembina Co) and collapsed an old barn near Northwood (Grand Forks Co).

33 OHIO — NONE REPORTED

STORM DATA AND UNUSUAL WEATHER PHENOMENA

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS KILLED	NO. OF PERSONS INJURED	ESTIMATED† DAMAGE PROPERTY	ESTIMATED† DAMAGE CROPS	CHARACTER OF STORM
34 OKLAHOMA									
Logan County Nrn Lovell	18	1930CST			0	0	?	?	Hail (0.88)
Logan County 4 N Crescent	18	2052CST			0	0	?	?	Hail (0.75)
Kingfisher County 10 N Cashion	18	2110CST			0	0	?	?	Hail (1.00)
Payne County 14 W Stillwater	18	2115CST			0	0	?	?	Hail (0.75)
Logan County 4 N Guthrie	18	2140CST			0	0	?	?	Hail (1.00)
	Thunderstorms caused 40 to 50 mph winds and scattered hail between 3/4 and 1 inch in size. No significant damage was reported.								
Caddo County 2 S Fort Cobb	25	2115CST			0	0	?	?	Twind (52)
Caddo County Cyril	25	2200CST			0	0	?	?	Hail (1.75)
Garvin County 2 WSW Lindsay	25	2200CST			0	0	?	?	Hail (0.88)
Grady County 2 WSW Cox City	25	2205CST			0	0	?	?	Hail (1.00)
Johnston County 4 NNW Mill Creek	25	2230CST			0	0	?	?	Hail (1.75)
Carter County Lone Grove	25	2330CST			0	0	5	?	Twind (60)
Johnston County Mannsville	25	2345CST			0	0	?	?	Hail (0.75)
Marshall County Oakland	25	2350CST			0	0	?	?	Twind (60)
Marshall County Madill	25	2355CST			0	0	?	?	Twind (60)
	A line of severe thunderstorms developed across sections of the west-central area and moved southward producing hail up to golfball size and winds of 60 to 70 mph. Many areas suffered downed trees, power poles, and lines. Strong winds took the roof off of a gymnasium in Lone Grove which also allowed rain to ruin the floor. A house was damaged and two mobile homes were turned over. Many houses in Lone Grove suffered shingle damage. Total damage in Lone Grove was estimated at $450,000. Several businesses suffered damage in Oakland and Madill from strong winds. An elevator was destroyed and roof damage occurred at a peanut company. Several other businesses suffered roof damage and broken glass which allowed rain to enter the buildings. Damage in Madill and Oakland was estimated at $250,000.								
Harmon County 4 S Gould	30	1800CST			0	0	5	?	Hail (1.75) Twind (64)
Greer County 5 SE Mangum	30	1810CST			0	0	?	?	Hail (1.50)
Harmon County 6 SSE Gould	30	1810CST			0	0	?	?	Twind (64)
Jackson County Eldorado	30	1844CST			0	0	?	?	Hail (1.75) Twind (52)
Jackson County Eldorado	30	1930CST			0	0	?	?	Hail (1.75) Twind (52)
Jackson County 4 SW Olustee	30	2000CST			0	0	?	?	Hail (1.75)
Jackson County Duke	30	2030CST			0	0	?	?	Hail (0.75)
Harmon County 6 SSE Gould	30	2030CST			0	0	?	?	Hail (0.88)
Garfield County Vance AFBase	30	2107CST			0	0	?	?	Twind (50)
Garfield County 2 SE Drummond	30	2110CST			0	0	5	?	Twind (60)
Jackson County 4 W Altus	30	2128CST			0	0	?	?	Hail (1.75)
	Thunderstorms developed in southwestern and the north central sections of the state producing winds over 70 mph and hail up to the size of golfballs. An oil rig that was tied down was overturned and badly damaged near Drummond. Damage was estimated at $95,000. Winds of 70 to 80 mph and golf ball size hail occurred in Gould. Most roofs were badly damaged as well as windows broken out and sides of houses dented by the wind blown hail. Damage was estimated at $200,000.								

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS KILLED	NO. OF PERSONS INJURED	ESTIMATED† DAMAGE PROPERTY	ESTIMATED† DAMAGE CROPS	CHARACTER OF STORM
35 OREGON									
Oregon	01-31				0	0	0	0	? ? DROUGHT
	Until the last day of the month little or no rain fell across the State of Oregon. Several areas only received a trace or less for the month. The Coast and Northwest valleys had less than 10% of normal. This continued the well below normal rainfall since the summer began. Medford, for example, went 99 consecutive days with no measurable rainfall, and is almost the equivalent of one year's rainfall below normal in the last four years. Many small and moderate size rivers are at their lowest flow levels ever. Numerous reservoirs have dropped to their lowest levels ever with rationing in many areas of the State. The forecast fire in southwest Oregon, started on the last week of August, burned through the entire month with nearly 100,000 acres consumed.								
36 PENNSYLVANIA, Eastern									
Montgomery County 6 SSE Norristown	7	0045 EST			0	0	4	0	TSTM Wind Hail(0.75)
	Thunderstorm wind gusts brought down numerous large trees causing many roads to be closed. Several automobiles were damaged by falling trees. Hail 3/4 inch in diameter also was reported.								
Philadelphia County 2 SW and in the vicinity of North Philadelphia Airport	7	0100 EST			0	0	4	0	TSTM Wind(69) Hail(0.75)
	Thunderstorm winds brought down 30 to 40 large tree limbs and tore off slate roofing. Winds were estimated at 60 to 80 MPH. Hail 3/4 inch in diameter also was reported.								
Delaware County 4 N Chester	7	0100 EST			0	0	3	0	TSTM Wind
7 NE Chester	7	0100 EST			0	0	3	0	TSTM Wind
8 NE Chester	7	0100 EST			0	0	3	0	TSTM Wind
8 NNE Chester	7	0100 EST			0	0	3	0	TSTM Wind
	Thunderstorm winds brought down numerous large trees, several of them damaging automobiles. The downed trees were in the towns of Folcroft and Swathmore and in the townships of Upper Darby, Darby and Haverford.								
Bucks County 1 S Doylestown	7	0130 EST			0	0	4	0	TSTM Wind(69)
	Thunderstorm winds broke off a lamp post, tore shingles off a roof, uprooted 3 large trees and bent aluminum siding. The damage was in an area 3 blocks long. Winds were estimated at 70 to 80 MPH.								
36 PENNSYLVANIA, Western— NONE REPORTED									
37 RHODE ISLAND———— NONE REPORTED									
38 SOUTH CAROLINA									
SCZ007,008 South Carolina Coast	12-13				0	0	2	0	Tropical Storm
	Tropical Storm Floyd formed in the western Caribbean Sea east of Belize on October 10th. The storm moved northward and reached hurricane intensity a few hundred miles southwest of the Florida Keys on the 12th. Floyd turned northeast and then east northeast passing through the Bahamas on the 13th and weakened. The only effect to South Carolina was higher winds than usual off and along the South Carolina Coast. Tides were slightly higher than normal on the 12th and 13th but beach erosion was minor.								
SCZ001,002,003,004 005,006,007,008 Statewide					0	0	0	4	Cold Weather
	October was unusually dry and cool. Average monthly temperatures lowest of record at many locations. Soybean yields reduced by cold weather.								

STORM DATA AND UNUSUAL WEATHER PHENOMENA

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

39 SOUTH DAKOTA — NONE REPORTED

40 TENNESSEE — NONE REPORTED

41 TEXAS, Northern

Cass County 4S Douglassville Atlanta	18 18	1620CST 1630CST	-	-	0 0	0 0	? 6	? ?	TSTM Wind TSTM Wind (75) and Hail (1.75)
4SE Atlanta	18	1638CST	-	-	0	0	?	?	Hail (1.75)
	Thunderstorm winds downed numerous trees and rolled 2 mobile homes at Gum Springs (4S Douglassville) at 1620CST. Thunderstorm winds up to 86 mph and hail up to golf ball size broke windows, damaged roofs, battered cars and downed trees and power lines in Atlanta at 1630CST. Rainfall of up to 4 inches accompanied the storm which produced damage estimated at over $1 million. Golf ball-size hail fell 4 miles southeast of Atlanta at 1638CST.								
Bowie County College Hill Cass County 3E Naples Douglassville	26 26 26	0220CST 0240CST 0240CST	- -	- -	0 0 0	0 0 0	? ? ?	? ? ?	Hail (1.00) Hail (1.00) Hail (1.00)
	Quarter-size hail fell at College Hill at 0220CST. One inch diameter hail fell 3 miles east of Naples and at Douglassville at 0240CST.								
Hopkins County 8NE Sulphur Springs	26	0400CST	-	-	0	0	?	?	TSTM Wind
	Thunderstorm winds downed a utility pole and unroofed a barn in the Hatchetville area (8NE Sulphur Springs).								
Nacogdoches County Appleby	26	0610CST	-	-	0	0	?	?	Hail (0.75)
	Dime-size hail fell at Appleby.								

41 TEXAS, Southern

Nueces County	23	1400CST			0	0	5	5	Flooding
	Up to 5.25 inches of rain fell over the extreme eastern part of the county resulting in flooded streets and low lying areas. Numerous streets were impassable and closed due to high water. The hardest hit areas were Flour Bluff, Corpus Christi Naval Air Station and northern Padre Island. Some flooding took place on the south side of the City of Corpus Christi.								

41 TEXAS, Western — NONE REPORTED

42 UTAH — NONE REPORTED

43 VERMONT

State-Wide	04	Early AM	--	--	0	62	7	7	Snow
	An early season snow storm created havoc across Vermont. Hardest hit was southern Vermont where an estimated 30,000 homes were without power. In Bennington County alone 94% of the trees sustained damage. Thousands of trees and power lines were brought down by the heavy wet snow and gusty winds. Conditions in many areas of southern Vermont were so bad, that the National Guard was called out. Snow depths in southern sections ranged up to 20 inches at North Springfield. Numerous busses and cars were involved in accidents as foliage sightseers were caught unexpectedly by the storm.								

44 VIRGINIA — NONE REPORTED

45 WASHINGTON — NONE REPORTED

46 WEST VIRGINIA — NONE REPORTED

47 WISCONSIN

Kenosha, Kenosha Co.	01	2115- 2130CST			0	0	5	0	Thunderstorm Wind
	A severe thunderstorm generated violent winds which caused about $100,000 in damage throughout the southern portion of Kenosha. The winds knocked down 50 trees, numerous limbs and electrical wires. A roof was peeled off a building which landed on 4 cars causing extensive damage. Four empty auto rack railroad cars were tipped over and several other buildings and homes received roof and window damage.								
WIZ002 Lake Superior Snow Belt	20 21	Afternoon into Mid Morning			0	0	0	0	Heavy Snow
	Cold air flowing off the warmer waters of Lake Superior dumped from 12 to 18 inches of snow over portions of eastern Ashland and northern Iron counties. Mellen (Ashland County) measured 18 inches, while 12 to 14 inches fell in a band from Birch Hill (Ashland County) to Hurley (Iron County) along Highway 2. Schools were closed. Roads were hazardous resulting in several accidents. Some electrical lines were downed, affecting power to 2000 customers.								

48 WYOMING — NONE REPORTED

49 ALASKA, Northern — NO REPORT RECEIVED

49 ALASKA, Southern

ALEUTIANS	05	1900BST			0	0	?	0	High Wind
	A strong storm in the western Aeutians brought 70 mph winds to Shemya.								
COOK INLET	08	0200AST			0	0	3	0	High Wind
	Chinook winds on the upper hillside of east Anchorage with the maximum reported gust 79 mph.								
KENAI PENINSULA	08- 09	1200AST			0	0	4	0	Heavy Rain
	Heavy rain, 7.25 inches in two days, fell in the Seward area causing minor flooding of the Ressurection River.								
COOK INLET	14	0300AST			0	0	3	0	High Wind
	Chinook winds in east Anchorage gusted to between 40 and 60 mph in most areas with the maximum gust 90 mph. There was some minor roof damage.								
YUKON-KUSKOKWIM DELTA	14	2100AST			4	0	4	0	High Wind Coastal Flooding
	An intense Bering Sea storm brought winds to 75 mph and minor flooding to the Yukon-Kuskokwim delta coast. Four seal hunters were drowned when their boat went down off of Sheldon Point. Some beached boats were damaged at Tooksook Bay and Emmonak.								
ALEUTIANS	20	1400AST			0	0	3	0	High Wind
	An Aleutian storm brought 75 mph gusts to Dutch Harbor.								
COOK INLET	22	2300AST			0	0	5	0	High Wind
	Strong chinook winds were widespread over the east Anchorage hillside with gusts from 50 to 70 mph in most areas. A few local gusts, one measured at 100+ mph did severe damage to several homes.								

STORM DATA AND UNUSUAL WEATHER PHENOMENA

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS		ESTIMATED† DAMAGE		CHARACTER OF STORM
					KILLED	INJURED	PROPERTY	CROPS	
49 ALASKA, Southeastern									
	10/4-								
All Southeast AK	10/5				0	0	3	0	High Winds
	An intense fall storm rolled north along the coast of Southeast Alaska bringing heavy rain and driving winds. Gusts of over 70 mph were reported at Elfin Cove while gusts over 60 mph were common across the Panhandle. The only reported damage occured in Sitka where a portion of the boat dock broke loose and a small power outage occurred.								
50 HAWAII									
Hawaii Island	1	Forenoon			0	0	4	0	Flash flooding
	Heavy rainfall overnight and into the forenoon hours and in excess of 10 to 15 inches along the Hamakua coast and over the Puna peninsula caused localized flooding mostly of a minor nature.								
Oahu	11	2300H			0	0	4	0	Flash flooding
	Heavy thunderstorms along the Oahu north shore and along the windward coast from Kaaawa northward for about two hours centered about midnight caused minor flash flooding in spots. Several cars washed away by flood waters.								
Kauai	15	1400H			0	0	4	0	Flash flooding
	Heavy showers across Kauai caused localized flash flooding. Also some heavy downpours on Oahu's northwest sections near Dillingham Field. Rains otherwise much appreciated by the Sugar growers.								
51 PUERTO RICO ——— NONE REPORTED									
52 VIRGIN ISLANDS ——— NONE REPORTED									
53 PACIFIC									
Northern Marianas	18-19	1700LST			0	2	5	5	Typhoon Lynn
	Typhoon Lynn with maximum sustained winds near 100 mph and gusts to 120 mph close to the center moved through the northern Marianas islands around midnight October 18th/19th. Winds on Guam about 85 miles south of the center gusted at 65 mph while gusts on Saipan, Tinian and Rota were near 100 mph. Strong winds and heavy rains occurred in most areas between 1700LST Sunday the 18th and 0600LST Monday morning. Two persons were injured cut by glass on Saipan and 200 people spent the night in shelters. Several wooden structures were blown over and widespread damage occurred to power lines. Greatest damage probably occurred to tender crops from wind and rain. Banana plants flattened in Typhoon Kim last December had just recovered and were damaged once again.								

STORM SUMMARY

OCTOBER 1987

TYPE	ALABAMA	ARIZONA	ARKANSAS	CALIFORNIA	COLORADO	CONNECTICUT	DELAWARE	FLORIDA	GEORGIA	IDAHO	ILLINOIS	INDIANA	IOWA	KANSAS	KENTUCKY	LOUISIANA	MAINE	MARYLAND & DC	MASSACHUSETTS	MICHIGAN	MINNESOTA	MISSISSIPPI	MISSOURI	MONTANA	NEBRASKA	NEVADA	NEW HAMPSHIRE
	0						0		0		0	0			0		0			0		0	0	0	0		0
TORNADOES																											
Number								1																			
Days								1																			
Deaths								0																			
Injuries								5																			
Property Damage								0																			
Crop Damage																											
HAIL																											
Deaths		0																									
Injuries		0																									
Property Damage		4																									
Crop Damage		?																									
THUNDERSTORM WINDS																											
Deaths		0														0											
Injuries		4														0											
Property Damage		6														4											
Crop Damage		?														?											
HIGH WINDS																											
Deaths													0					0			0						
Injuries													0					2			0						
Property Damage													4					6			4						
Crop Damage													7					0			0						
LIGHTNING																											
Deaths			0		0									1				1	0								
Injuries			0		0									1				2	0								
Property Damage			6		5									4				0	4								
Crop Damage			0		0									0				0	0								
FLASH FLOODS																											
Deaths		0		0																							
Injuries		0		0																							
Property Damage		4		6																							
Crop Damage		?		3																							
FLOODS																											
Deaths																										0	
Injuries																										0	
Property Damage																										2	
Crop Damage																										0	
HEAVY SNOWSTORMS AND BLIZZARDS @																											
Deaths						2													0								
Injuries						2													0								
Property Damage						5													5								
Crop Damage						?													4								
ICE STORMS #																											
Deaths																											
Injuries																											
Property Damage																											
Crop Damage																											
HURRICANES AND TROPICAL STORMS																											
Deaths								0																			
Injuries								0																			
Property Damage								5																			
Crop Damage								0																			
ALL OTHERS																											
Deaths				0						0																	
Injuries				0						0																	
Property Damage				?						6																	
Crop Damage				?						0																	

SEE REFERENCE NOTES FOR STORM DAMAGE CATEGORIES

STORM SUMMARY

OCTOBER 1987

TYPE	NEW JERSEY	NEW MEXICO	NEW YORK	NORTH CAROLINA	NORTH DAKOTA	OHIO	OKLAHOMA	OREGON	PENNSYLVANIA	RHODE ISLAND	SOUTH CAROLINA	SOUTH DAKOTA	TENNESSEE	TEXAS	UTAH	VERMONT	VIRGINIA	WASHINGTON	WEST VIRGINIA	WISCONSIN	WYOMING	ALASKA	HAWAII	PACIFIC	PUERTO RICO	VIRGIN ISLANDS	NATIONAL DEATH & INJURY TOTALS
		0				0				0		0	0		0		0	0	0		0	#			0	0	
TORNADOES																											
Number																											
Days																											
Deaths																											
Injuries																											
Property Damage																											
Crop Damage																											
HAIL																											
Deaths	0			0			0		0					0													
Injuries	0			0			0		0					0													
Property Damage	?			?			5		?					?													
Crop Damage	0			0			?		0					?													
THUNDERSTORM WINDS																											
Deaths	0						0		0					0						0							0
Injuries	0						0		0					0						0							4
Property Damage	4						6		5					6						5							
Crop Damage	0						?		0					?						0							
HIGH WINDS																											
Deaths					0																						0
Injuries					0																						2
Property Damage					4																						
Crop Damage					0																						
LIGHTNING																											
Deaths																											2
Injuries																											3
Property Damage																											
Crop Damage																											
FLASH FLOODS																											
Deaths																							0				
Injuries																							0				
Property Damage																							4				
Crop Damage																							0				
FLOODS																											
Deaths														0													
Injuries														0													
Property Damage														5													
Crop Damage														5													
HEAVY SNOWSTORMS AND BLIZZARDS @																											
Deaths			1													0											3
Injuries			?													0											2?
Property Damage			9													7											
Crop Damage			7													7											
ICE STORMS #																											
Deaths																											
Injuries																											
Property Damage																											
Crop Damage																											
HURRICANES AND TROPICAL STORMS																											
Deaths											0													0			0
Injuries											0													2			2
Property Damage											2													5			
Crop Damage											0													5			
ALL OTHERS																											
Deaths				0				0			0																
Injuries				0				0			0																
Property Damage				?				?			0																
Crop Damage				?				?			4																

SEE REFERENCE NOTES FOR STORM DAMAGE CATEGORIES

STORM DATA AND UNUSUAL WEATHER PHENOMENA

LATE REPORTS

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS KILLED	NO. OF PERSONS INJURED	ESTIMATED† DAMAGE PROPERTY	ESTIMATED† DAMAGE CROPS	CHARACTER OF STORM
12 INDIANA									
MAY 1987									
Spencer County, 3N Rec	19	2038 CST			0	0	?	?	Tstm.Wind
A spotter reported 60 mph winds. Numerous tree limbs were downed by the high winds.									
JUNE 1987									
Warrick County, Scalesville	22	2125 CST			0	0	?	?	TSTM WIND
A spotter reported winds of 60 mph. Road signs were blown down by the high winds.									
17 MAINE									
APRIL 1987									
Southern and Central Maine Androscoggin, Cumberland, York, Oxford, Franklin, Kennebec, Lincoln, Sagadahoc, Waldo, Knox, Somerset, Piscataquis, Penobscot, Hancock, Western Washington Counties.	01-05	0000EST - 2300EST			0	0	8	5	Heavy Rain and Record Flooding

A few days prior to the flooding, northern New England was enjoying pleasant Spring weather. There was plenty of sunshine during the day with maximum temperatures from the middle 50s to the middle 60s. The warm weather started to move the water out of the snowpack which was near the seasonal normal.

A low pressure system formed on a cold front over Virginia on March 31. The low moved slowly northeast bringing heavy rain to New England, especially in the headwaters of Maine's rivers. Since it stayed warm, temperatures in the 50s, while the rain was falling, most of the water in the snowpack was released by the melting snow. The combination of water from the snowpack and rainfall created much more runoff than the rivers could handle. The Piscataquis, Sebec, Kennebec, Sandy, Carrabassett, Sebasticook, Sheepscot, Wild, and Little Androscoggin set new record flood stages, as did Kenduskeag Stream.

Statewide, 2300 homes were flooded, 215 were totally destroyed and another 240 sustained major damage. More than 150 roads were closed and 3 State-maintained bridges were washed away and 13 others were closed. Train service was reduced to a standstill as trains were stranded between washouts. Several thousand people were evacuated and many areas were left without electric and telephone service. Drinking water was polluted in several communities. The State Department of Human Services issued orders to boil drinking water in Madison, Strong, Howland, Guilford, Sangerville, Milo and Peru. The State of Maine embargoed all food in about 180 stores that sustained flood damage or lost power for more than 24 hours.

Statewide damage estimates were in excess of 100 million dollars. $64 million in damages was done to public property (highways, bridges, buildings, sewerage and water systems, parks and recreational facilities), $19.4 million to families and individuals, $45 million to businesses, and $.4 million to agricultural land. The worst areas hit were along the Androscoggin, Kennebec and Piscataquis Rivers and their tributaries. Augusta, Gardiner and Guilford received more than $5 million damage. Dover-Foxcroft, Milo, Howland, Milford, Hartland, Pittsfield, Anson, Madison, Skowhegan, Norridgewock, Fairfield, Waterville, Winslow, Hallowell, Rumford, Mexico, Peru, Canton, Livermore Falls, Lewiston, Auburn, Lisbon and Topsham received between $.5 and $5 million worth of damage. Another 65 communities had between $50 and $500 thousand of damage.

In Guilford, the Piscataquis River flooded the bottom two floors of Guilford Industries, Pride Manufacturing was closed and lost about 600 cords of birch logs, about 120 people were evacuated including a senior citizens housing development and historic Lowe's Covered Bridge was washed away. In Milo, the Sebec River flooded a major generating substation knocking out power to 3000 homes. In Dover-Foxcroft, Route 16 washed out and the National Guard was called in to supply drinking water. The greater Bangor area was hard hit by flooding on the Penobscot River and Kenduskeag Stream. In Livermore Falls, the Androscoggin River flooded a trailer park, homes, and a skating rink. Damage was extensive to a small dam and the sewerage treatment facility. Rumford was cut off from the outside world for more than 24 hours. More than 100 homes in the Rumford-Mexico area suffered heavy damage by the flooding Swift and Androscoggin Rivers. In Canton, about 50 nursing home residents were evacuated as 10 feet of water from the Androscoggin River covered Route 108. Route 140 from Canton to Jay was also closed. In Winslow, the entire neighborhood on Lithgow Street was washed down the Kennebec River. The town's most historic landmark, the 233 year old Fort Halifax, was also washed away. In Hallowell, the downtown area, including the city's famous

LATE REPORTS

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

antique shops, were evacuated. Damage was extensive. In Lisbon a hydroelectric dam in the early stages of construction was completely destroyed. In Hiram, the swollen Saco River cut off the business district and covered sections of Routes 113 and 117 with three feet of water. In Biddeford-Saco, the flooding Saco River forced about 350 residents to evacuate and tore down the wall of a factory building.

MEZ 006-009-012-013	28-29	2200EST- 1200EST			0	0	5		Heavy Snow

Heavy snow fell over higher elevations of southern and central Maine as a low pressure system moved northeast along the coast. Heavy wet snow caused many power outages and made for "greasy" traveling. Snowfall amounts by zone were:

.....Zone 006.....		.....Zone 009.....	
Millinocket	8	Brassua Lake	13
Ripogenus	6	Moosehead	9
Blanchard	7	Flagstaff	12
Guilford	8	Eustis	10
Barnard	11	Kingfield	8
.....Zone 012.....		Phillips	7
Rumford	11	.....Zone 013.....	
New Sharon	9	E. Hiram	10
Lovell	7	Waterboro	7
Bethel	6	Gorham	5

27 NEW HAMPSHIRE

APRIL 1987

Southern and Central New Hampshire Counties of Belknap, Carroll, Chesire, Grafton, Hillsborough, Merrimack, Strafford, Sullivan and Rockingham	01-02 05-09	0000EST- 2300EST			1	8	7	5	Heavy Rain and Flooding

A few days prior to the flooding, northern New England was enjoying pleasant spring weather. There was plenty of sunshine during the day with maximum temperatures from the middle 50s to the middle 60s. The warm weather started to move the water out of the snowpack which was near the seasonal normal.

A low pressure system formed on a cold front over Virginia on March 31. The low moved slowly northeast bringing heavy rain to New England, especially in the headwaters of the rivers. Since it stayed warm, temperatures in the 50s, while the rain was falling, most of the water in the snowpack was released by the melting snow. The combination of water from the snowpack and rainfall created more runoff than the rivers could handle.

Just as the rivers were falling back within their banks, another low pressure formed in the Carolinas. This low intensified as it moved very slowly north, bringing another dose of heavy rain to southern and central sections. Heaviest amounts from this storm were in the six to seven inch rain from Bradford to Peterborough. With the ground being already soaked, it created much more runoff than the rivers could handle. Fortunately, the flood control dams were able to hold most of the runoff or the flooding would have been much more severe. It was estimated that the dams held back 270 billion gallons of flood waters. Record water levels were reached at Everett Dam, Surry Mountain Dam, Otter Brook Dam, and MacDowell Dam. For the first time, water flowed out the emergency spillways at several of the dams.

Statewide, there were approximately 2600 people forced from their residences by rising flood waters. 1897 homes and apartments were reached by the rising waters. 1184 of them received significant damage. 103 State and Town maintained roads were closed due to washouts and water. 78 communities in nine counties received significant damage. The hardest hit areas were Plymouth, Holderness, Ossipee, Goffstown, Epping, and Marlborough. Total statewide damage estimates were $10.7 million, $3.9 million to residences, $3.6 million to businesses, $2.8 million to public property (primarily roads and bridges), and $.4 million to agricultural lands.

In Alton, eight children were injured when the school bus in which they were traveling bounced into a ditch and then back onto the road after hitting a patch of washed out roadway. In Wilton, a 27 year old Massachusetts man was killed in a canoe accident in rough waters on the Souhegan River.

Franconia State Park received about $500,000 damage to its recreational facilities. Plymouth State College had $300,000 damage done to its athletic facilities. 400-500 people were evacuated in the Plymouth-Holderness area. Damage to businesses was extensive in those communities. In Keene, about 500 people were evacuated due to the flooding Ashuelot River. 330 people were evacuated from two trailer parks in Deering. In Goffstown, 60 families were forced from their homes by the rising Piscataquog River. About 100 people were evacuated along the Merrimack River in Nashua. Other sizable evacua-

STORM DATA AND UNUSUAL WEATHER PHENOMENA

LATE REPORTS

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	

NEW HAMPSHIRE

tions occurred in Campton, Claremont, Lebanon, Allenstown, Marlborough, Ossipee, Epping, Hinsdale, Salem, and Exeter. Several small bridges were washed out in the Deering and New Boston areas. One in Milford will cost $250,000 to replace. Several roads and the Filtrine Manufacturing Company were extensively damaged in Harrisville. More than $1,000,000 damage was done in West Ossipee, Holderness, and Epping.

NHZ 001-002-003-004 005-006	28-29	1800EST-1200EST		1	0	6			Heavy Snow

Heavy snow fell over higher elevations of the state as a low pressure system moved northeast along the coast. Heavy wet snow caused widespread power outages. Approximately 43,000 homes and businesses were without electricity, most of them for 18 hours or longer. A 78 year old Claremont woman died in a two car crash on Route 103 in Newbury. State Police blamed slippery roads for the accident. Public Service Co. labeled this the worst spring storm in ten years due to the damage that was done to its power supply system. Snowfall amounts by zone were:

.....Zone 001.....		.....Zone 002.....	
Berlin	10	Gorham	8
Big Diamond	7	Lincoln	6
1st Conn Lk	5	Bath	5
N. Stratford	5	.....Zone 003.....	
.....Zone 004.....		Bradford	16
Tamworth	12	Marlow	12
Blackwater	12	Bristol	12
Barnstead	9	Lebanon	6
Franklin	8	.....Zone 005.....	
.....Zone 006.....		MacDowell Dam	12
Francestown	18	Surry Mtn Dam	10
Mt. Vernon	17	Otter Brook Dam	9
E. Derry	12	Walpole	7
Hopkinton	9	Keene	4
Nashua	8		
Concord	7		
Salem	5		

CORRECTIONS

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	

5 COLORADO

MAY 1987

DELETE:
ONE TORNADO — in Rio Grande County at 1413MST on the 14th, appearing on page 25.

ADD:
ONE DUST DEVIL — as reported below:

COZ009 Rio Grande County	14	1413MST	1/4	20	0	0	0	0	Dust Devil

A vortex in contact with the ground was observed for three minutes in an open field near Del Norte. Two weather service employees in the area at the time did not view any thunderstorm activity in the vicinity, and believe this phenomenon was a strong dust devil.

NOTE: As a result of the above deletion, the number of tornadoes for May 1987 in the map on page 3 should be as follows:

F0	F1	F2	F3	F4	F5	Total
78	36	9	2	1	0	126

STORM SUMMARY

LATE REPORTS

APRIL 1987

Page 36: MAINE - Floods - Property Damage = 8
Crop Damage = 5

- Heavy Snowstorms and Blizzards
Property Damage = 5

Page 36: NEW HAMPSHIRE - Floods - Property Damage = 7
Crop Damage = 5

- Heavy Snowstorms and Blizzards
Property Damage = 6

CORRECTIONS

MAY 1987

Page 66: COLORADO - Tornadoes - Number = 2 (vice 3)
Days = 2 (vice 3)

REFERENCE NOTES

STORM DAMAGE CATAGORIES

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

0/Blank	None reported.
*	Miles instead of yards.
**	Yards instead of miles.
@	Includes heavy sleet storm.
#	Freezing drizzle and freezing rain, commonly known as glaze.
≠	Report incomplete.
##	Report not received.
o/c	Indicates Crop Damage amount is included in the value given for property damage.

When reports are not received or are incomplete, the Storm Summary National Death and Injury totals may also be incomplete.

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.

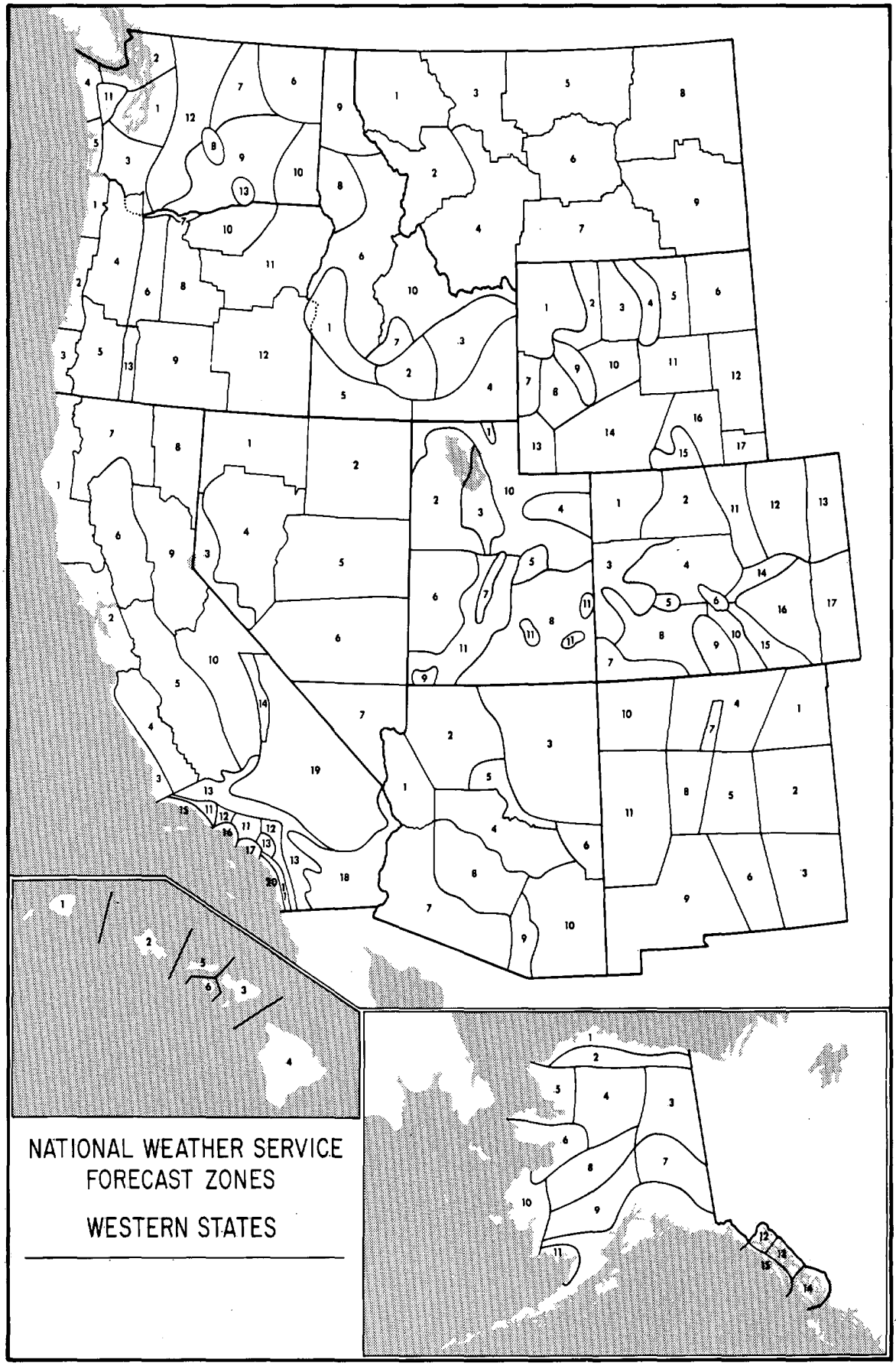
(F4) Devastating tornado (207-260 mph): Devastating damage
Well-constructed houses leveled; structure with weak foundation blown off some distance; cars thrown and large missiles generated.

(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.

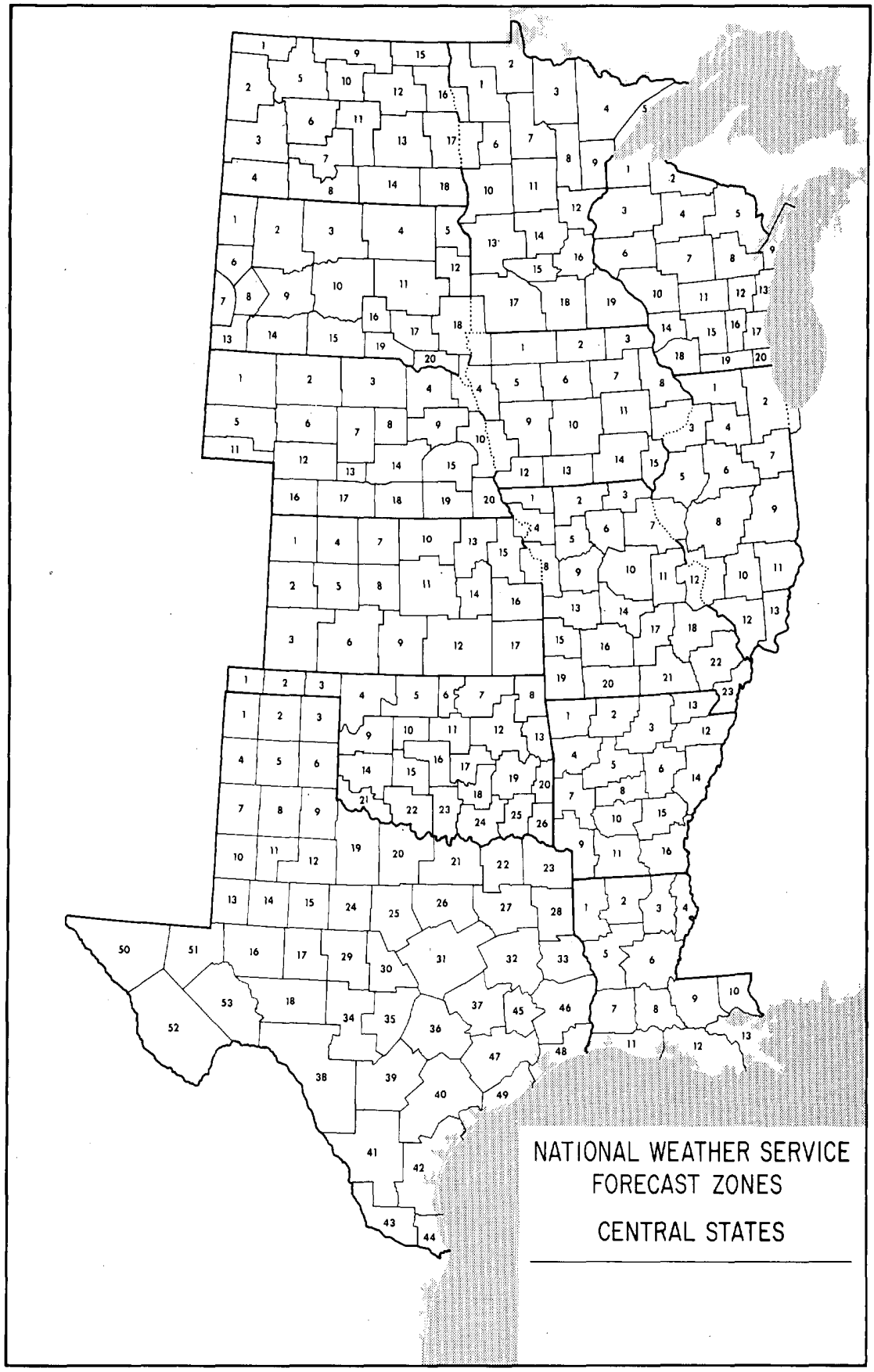
(F0+F1) Weak Tornado
(F2+F3) Strong Tornado
(F4+F5) Violent Tornado

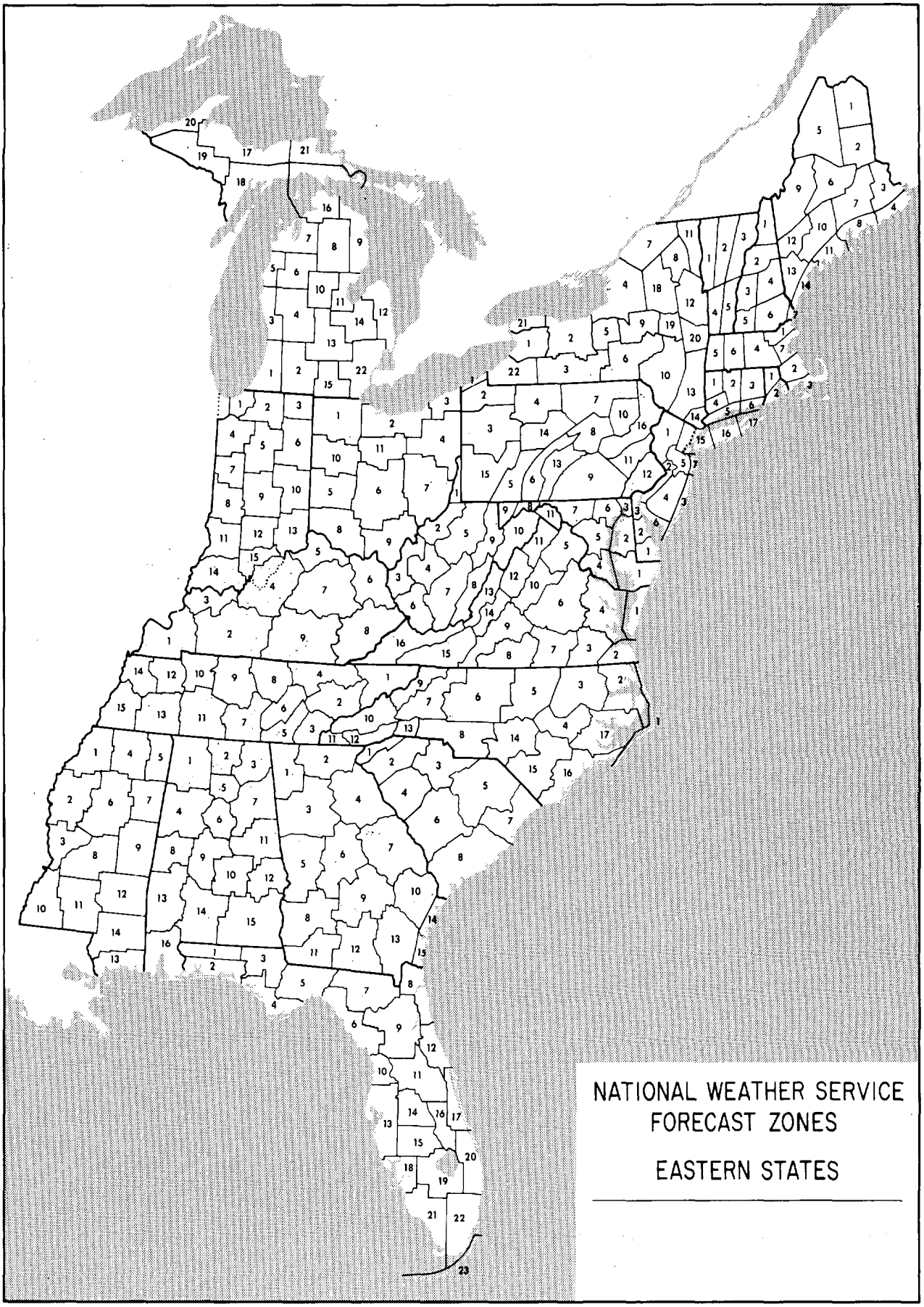
From J. Atmos. Sci., August 1981, p. 1517-1519



NATIONAL WEATHER SERVICE
FORECAST ZONES

WESTERN STATES


NATIONAL WEATHER SERVICE
FORECAST ZONES
CENTRAL STATES



NATIONAL WEATHER SERVICE FORECAST ZONES

EASTERN STATES

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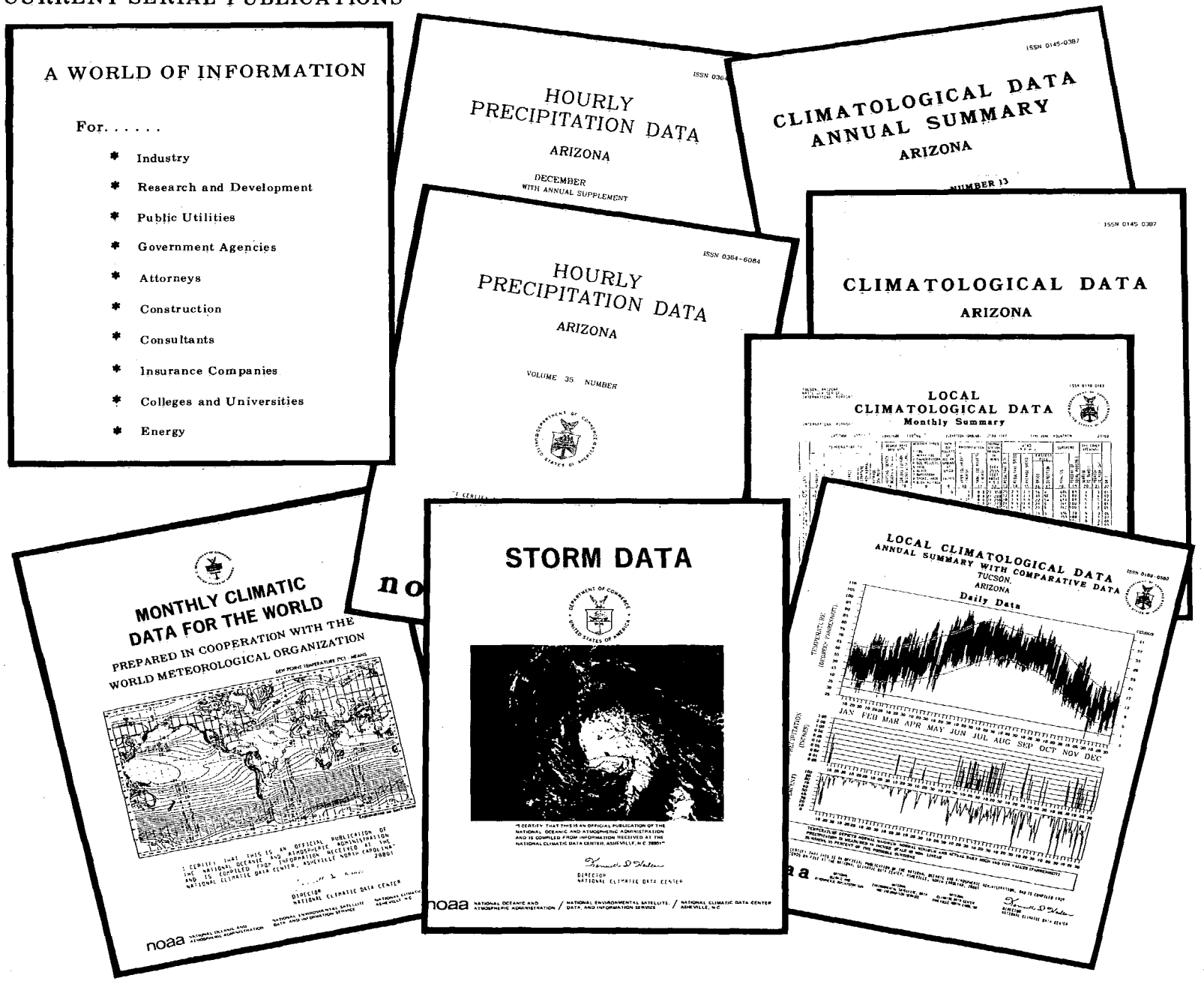

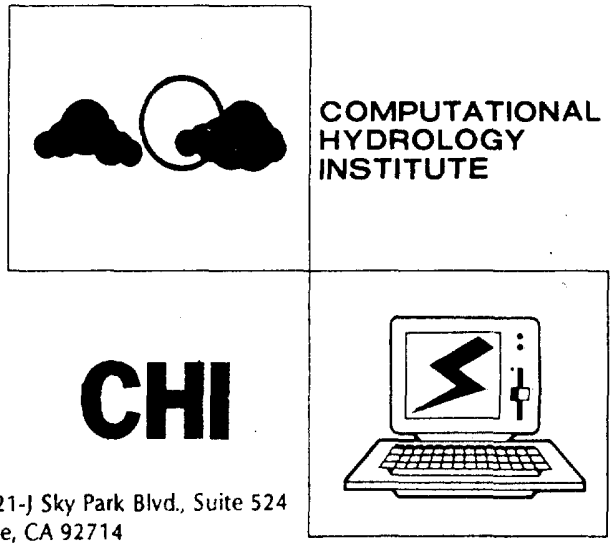

COMPUTATIONAL
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COMPUTATIONAL HYDROLOGY 88

Second International Symposium on Computational Methods In Flood Control Hydrology & Hydraulics, Surface & Subsurface Hydrology, and Water Resources Engineering

San Diego, California
July 10 – 13, 1988

Chief among the concerns of environmental impacts are the effects of storm runoff on existing and urbanized watersheds. Such concerns as stormwater management, surface runoff pollution, and methods for hydraulic and hydrologic modeling are only a few of the many problems faced by today's private engineering concerns and public agencies. This international conference, COMPUTATIONAL HYDROLOGY 88, aims at providing a forum for presenting the latest innovative and applied computational methods in flood control hydrology and hydraulics, surface and subsurface hydrology, and water resources engineering.

Objectives

The major objective of COMPUTATIONAL HYDROLOGY 88 is the creation of a proper forum of discussion among managers, scientists, and engineers involved in the creation, development of application of computer software to hydrologic problems. COMPUTATIONAL HYDROLOGY 88 will present the most recent developments and practical implementations in the theoretical, numerical and applicable aspects of computer analysis, simulation modeling, control and forecasting for hydrologic applications. The conference aims at the establishment of a useful connection between originators of hydrologic software programs and their possible users, thus reducing the present large duplication of effort in software development.

Conference Chairmen

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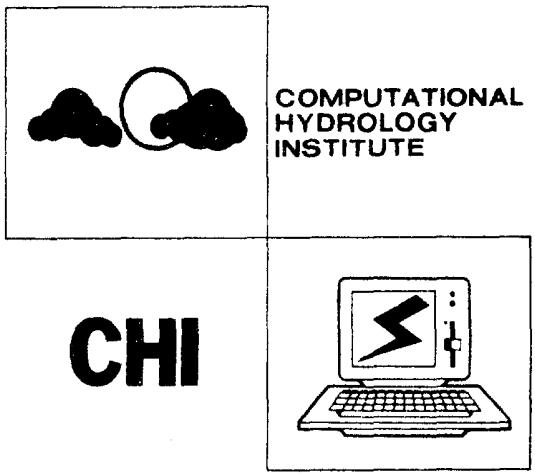

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DETAILS ON PAGE REVERSE
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