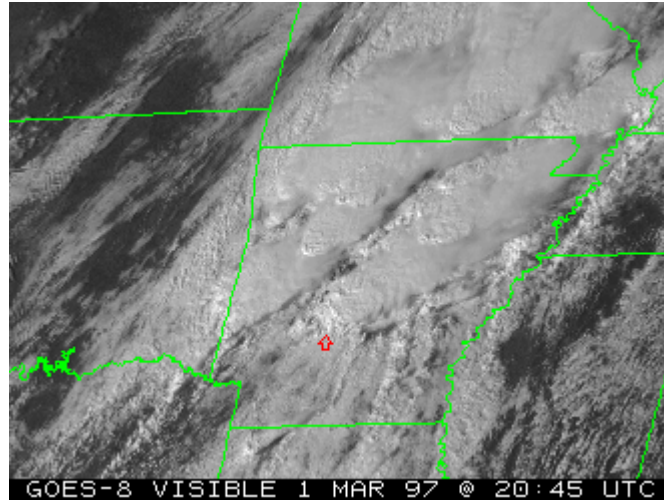


March 1997 Tornadoes and Flooding



Brief Summary

On March 1, 1997, a severe weather situation with tornadoes and very heavy rainfall erupted along a nearly stationary front from Texas to West Virginia. At mid-afternoon on Saturday, an outbreak of strong to violent tornadoes in Arkansas, northern Mississippi, and western Tennessee resulted in 29 deaths, including 26 in Arkansas. Several of the tornadoes have been estimated as F4 intensity, with winds in the 207-260 mph range. This was the deadliest U.S. outbreak since March 27, 1994, when 42 were killed in Alabama, Georgia, and South Carolina. Fortunately in this outbreak, the National Weather Service issued tornado warnings from 10 to 32 minutes before the tornadoes struck, using NEXRAD radar to provide much more lead time than previously possible. As of May 28th this year, 67 tornado-related deaths have been reported for 1997 vs. 24 for all of 1996.

This event also produced unusually heavy rainfall from northeast Arkansas through western Tennessee and southeast Missouri, and into much of Kentucky, southern Indiana and Ohio, and West Virginia. In many areas, the rains fell on nearly saturated ground left by the snows and rainfall of the past few months. In parts of northern Kentucky, rainfall rates averaged at least one inch per hour for a 12-hour period on March 1.

Following is a state-by-state account as of June 11:

Arkansas--26 people killed by tornadoes. 18 counties declared federal disaster areas.

Approximately 1200 homes damaged or destroyed. Arkadelphia was hardest hit with sections completely destroyed. Following is the preliminary tornado track information for the most deadly of the F4 tornadoes:

Tornado path began in the southwest part of Clark County with major damage and loss of life in Arkadelphia. Damage path width of .25 to .60 miles in this area with some F4 damage. Tornado continued through Hot Spring County and much of Saline County, and reached F4 intensity across a .80 mile damage path as it moved through the Shannon Hills area and finally into Pulaski County. Total path length was 80 miles. 16 people killed by this storm.

Texas--2 killed by severe thunderstorms and high winds.

Mississippi--2 deaths as a result of tornadoes. The Mississippi River was expected to crest 6 feet above flood stage at Vicksburg by March 21, mainly due to incoming water from the Ohio River.

Tennessee--6 people killed by tornadoes and flooding. 12 counties declared federal disaster areas. About 900 homes damaged or destroyed.

Kentucky--21 people killed by flooding. 101 counties declared federal disaster areas. Over 75,000 homes damaged or destroyed, and \$250-500 million in damage. The Ohio River crested on March 7 in Louisville at about 16 feet above flood stage. The town of Falmouth (population 2700) was almost totally destroyed, with water over 8 feet deep in town. The 24-hour rainfall amount of 10.48 inches in Louisville erased the previous state record of 10.40 set in Dunmore on June 28, 1960. Louisville's storm total of 13.04 was also the greatest of any of the reporting stations with data available thus far.

Ohio--5 people killed by flooding. 17 counties declared federal disaster areas. Over 5500 homes damaged or destroyed, and over \$200 million in damage.

Indiana--1 death due to flooding. 13 counties declared federal disaster areas.

Missouri--1 death due to flooding.

West Virginia--3 people killed in flooding. 16 counties declared federal disaster areas. Over 4000 homes damaged or destroyed.

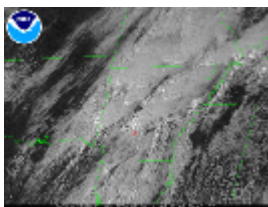
The above damage estimates are rising as flooded areas are evaluated, and several states have yet to provide estimates. A total of 67 deaths have thus far been attributed to this event, and damages are estimated at approximately \$1 billion overall. The last significant flooding along the Ohio River occurred in 1964, resulting in 11 deaths and about \$50 million damage. Since that time, a great deal of development and increased population on the region's flood plains have increased the vulnerability for some of the people in the area. Prior to 1964, the "great flood of 1937" was even more severe, with some towns erecting flood walls shortly thereafter. These flood walls (including one protecting

Louisville) prevented this year's flooding from taking an even greater toll.

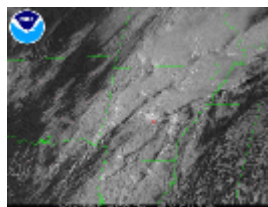
The rainfall analysis images and data table below are based on preliminary data from the National Weather Service. Final, more complete data will be available from NCDC at a later date. The satellite images provide a quick look at the synoptic situation as it unfolded.

Satellite/NEXRAD Images and Precipitation Maps

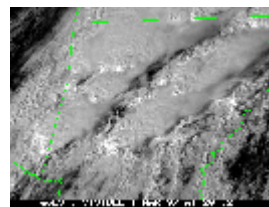
Click on the following images to view full size versions.



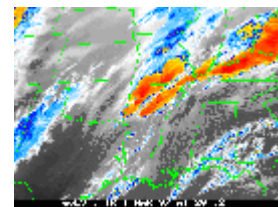
[Satellite Visible
Arkadelphia Tornado](#)
(387KB)



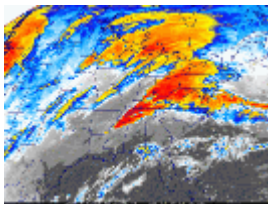
[Satellite Visible
Sardis Tornado](#)
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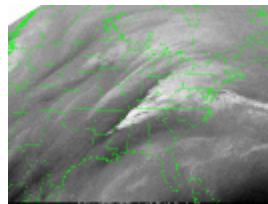
[Visible MPEG
AR Tornadoes](#)
(695KB)



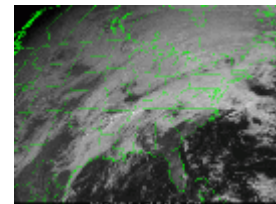
[IR MPEG
AR Tornadoes](#)
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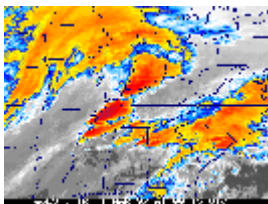
Regional IR
[March 1 0915Z](#)
[March 1 2115Z](#)
[March 2 0915Z](#)
(220KB)



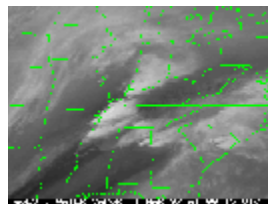
Regional Water Vapor
[March 1 0915Z](#)
[March 1 2115Z](#)
[March 2 0915Z](#)
(125KB)



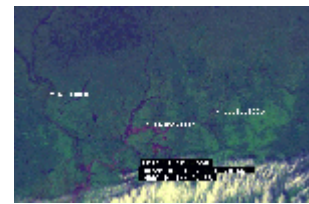
Regional Visible
[March 1 1515Z](#)
[March 1 2115Z](#)
[March 2 1515Z](#)
(350KB)



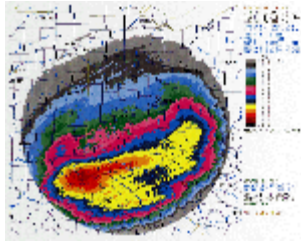
[IR MPEG
Heavy Rainfall](#)
(754KB)



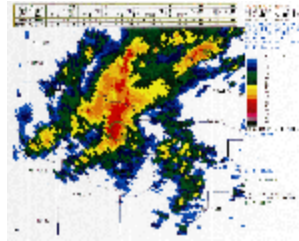
[Water Vapor MPEG
Heavy Rainfall](#)
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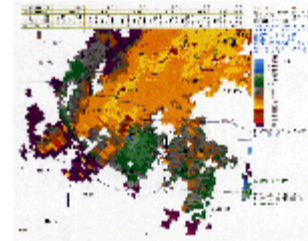
[Enhanced AVHRR
River Flooding](#)
(264KB)



[NEXRAD Storm Total
Estimated Rainfall](#)
(120KB)

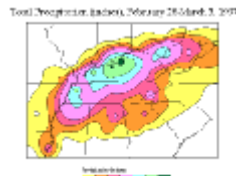


[NEXRAD Arkansas
Base Reflectivity](#)
(100KB)

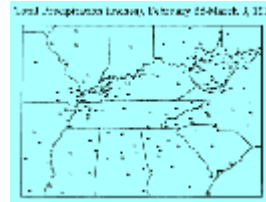


[NEXRAD Arkansas
Radial Velocity](#)
(100KB)

Rainfall Amounts



[Contoured](#)



[Plotted](#)

Precipitation Table, Feb 28 - Mar 03

Total Precipitation (inches), February 28-March 3, 1997

St	Station	Lat. dg	Lon. mn	Prec.
AL	Alabaster	33 15	86 49	3.49
AL	Anniston	33 35	85 51	1.67
AL	Auburn	32 37	85 26	1.26
AL	Birmingham	33 34	86 45	2.18
AL	Dothan	31 19	85 27	TRACE
AL	Gadsden	33 58	86 5	4.72
AL	Huntsville/Decatur	34 39	86 46	2.83
AL	Montgomery	32 18	86 24	0.55
AL	Muscle Shoals	34 45	87 37	3.55
AL	Pinson	33 41	86 42	2.57
AL	Tuscaloosa	33 13	87 37	1.00
AR	El Dorado	33 13	92 48	1.33
AR	Jonesboro	35 50	90 39	3.12
AR	Little Rock	34 44	92 14	1.13
AR	North Little Rock	34 50	92 15	1.35
AR	Pine Bluff	34 11	91 56	0.91
GA	Alma	31 32	82 30	0.00
GA	Athens	33 57	83 19	2.68
GA	Atlanta	33 39	84 25	2.99
GA	Augusta	33 22	81 58	0.57
GA	Brunswick	31 9	81 23	0.00
GA	Columbus	32 31	84 56	0.73
GA	Gainesville	34 18	83 51	3.15
GA	Macon	32 42	83 39	0.01
GA	Marietta	33 55	84 31	2.53

GA Peachtree City	33	22	84	34	3.24
GA Rome	34	21	85	10	3.02
GA Savannah	32	8	81	12	TRACE
IL Brookport	37	8	88	38	5.27
IL Carbondale	37	43	89	13	1.34
IL Metropolis	37	9	88	43	7.25
IL Peoria	40	40	89	41	0.26
IL Quincy	39	57	91	12	0.24
IL Shawneetown	37	43	88	10	4.87
IL Springfield	39	51	89	40	0.32
IL Whittington	38	5	88	54	1.46
IN Boonville	38	3	87	16	3.68
IN Evansville	38	3	87	32	3.40
IN Fort Wayne	41	0	85	12	0.02
IN Indianapolis	39	44	86	16	0.41
IN New Albany	38	18	85	50	9.07
KY Barkley Lake	37	1	88	13	7.96
KY Bowling Green	36	58	86	25	8.28
KY Cadiz	36	52	87	49	7.41
KY Cannelton Lock	37	53	86	46	10.40
KY Cobb	36	59	87	46	6.03
KY Covington	39	3	84	40	2.65
KY Dawson Springs	37	10	87	41	6.65
KY Dixon	37	31	87	41	6.75
KY Elk Creek	38	6	85	22	8.86
KY Elkton	36	49	87	9	7.40
KY Fort Campbell	36	39	87	28	8.61
KY Fort Knox	37	53	85	58	9.90
KY Frankfort	38	11	84	52	9.28
KY Fredonia	37	13	88	4	9.53
KY Fulton	36	31	88	53	3.37
KY Grayson 2E	38	20	82	54	5.94
KY Grayson 3SW	38	18	82	58	6.56
KY Hickman	36	34	89	11	3.65
KY Jackson	37	36	83	19	3.97
KY Kentucky Lake	37	1	88	16	6.35
KY Lexington	38	2	84	36	8.26
KY Louisville	38	11	85	44	13.04
KY Madisonville	37	20	87	30	6.20
KY Marion	37	20	88	5	8.17
KY Paducah	37	4	88	46	6.76
KY Paradise	37	16	86	59	8.39
KY Princeton	37	6	87	53	9.35
KY Prospect	38	21	85	37	9.53
KY Providence	37	24	87	45	9.23
KY Rough River Lake	37	37	86	30	9.70
KY Sebree	37	36	87	32	7.54
KY Shepherdsville	37	59	85	43	10.53
KY Smithland	37	8	88	24	4.36
LA Alexandria	31	20	92	33	0.44
MO Advance	37	6	89	55	2.11
MO Cape Girardeau	37	14	89	34	3.54
MO Charleston	36	55	89	20	5.66
MO Clearwater Dam	37	7	90	47	2.20
MO Columbia	38	49	92	13	0.30
MO Doniphan	36	37	90	49	1.40

MO Marble Hill	37	18	89	59	1.38
MO New Madrid	36	35	89	33	4.53
MO Sikeston	36	53	89	35	6.10
MO St. Louis	38	45	90	22	0.20
MS Columbus AFB	33	39	88	27	2.41
MS Greenwood	33	30	90	5	3.24
MS Jackson	32	19	90	5	0.49
MS McComb	31	11	90	28	0.54
MS Meridian	32	20	88	45	1.28
MS Natchez	31	37	91	18	3.92
MS Tupelo	34	16	88	46	5.51
NC Asheville	35	26	82	33	2.37
NC Beech Mountain	36	13	81	53	1.87
NC Charlotte	35	13	80	56	1.46
NC Fayetteville	35	8	78	56	0.66
NC Franklin	35	11	83	25	2.73
NC Grandfather Mtn.	36	6	81	49	0.46
NC Greensboro	36	5	79	57	1.81
NC Hendersonville	35	20	82	27	2.61
NC Hickory	35	44	81	23	2.00
NC Lenoir	35	55	81	32	1.55
NC Murphy	35	7	84	0	2.48
NC Raleigh/Durham	35	52	78	47	0.56
NC West Jefferson	36	25	81	26	1.75
OH Akron	40	55	81	26	0.46
OH Beverly	39	33	81	38	3.77
OH Carpenter	39	8	82	12	6.58
OH Cincinnati-Lunken	39	6	84	25	2.16
OH Columbus	40	0	82	53	1.26
OH Dayton	39	54	84	12	1.20
OH Jackson	39	3	82	38	6.67
OH Mansfield	40	49	82	31	0.55
OH Marietta	39	25	81	27	4.84
OH McArthur	39	15	82	29	5.55
OH McConnelsville	39	39	81	51	6.83
OH Nelsonville	39	28	82	14	4.48
OH New Lexington	39	43	82	12	2.50
OH Patriot	38	44	82	20	8.20
OH Salem Center	39	3	82	16	6.21
OH South Point	38	25	82	34	6.44
OH Zanesville	39	57	81	54	1.78
PA Pittsburgh	40	30	80	13	0.60
SC Beaufort	32	29	80	43	TRACE
SC Charleston-Airport	32	54	80	2	0.02
SC Charleston-City	32	47	79	56	0.01
SC Columbia	33	57	81	7	0.81
SC Greer	34	54	82	13	2.29
TN Bradford	36	4	88	49	6.31
TN Bristol	36	29	82	24	2.46
TN Cades Cove	35	34	83	51	3.51
TN Camden	36	4	88	6	6.05
TN Chattanooga	35	2	85	12	2.45
TN Crossville	35	57	85	5	4.04
TN Dyersburg	36	0	89	24	7.51
TN Humboldt	35	49	88	54	5.25
TN Huntington	36	1	88	25	3.57

TN Jackson	35	36	88	55	5.30
TN Knoxville	35	49	83	59	2.71
TN Medon	35	28	88	52	6.79
TN Memphis	35	3	90	0	5.50
TN Morristown	36	10	83	24	3.71
TN Mt. Leconte	35	39	83	26	4.92
TN Nashville	36	8	86	41	4.51
TN Newfound Gap	35	34	83	25	5.80
TN Rutherford	36	8	89	0	10.52
TN Sugarland Center	35	41	83	32	3.13
VA Blacksburg	37	14	80	26	1.54
VA Bland	37	6	81	6	1.70
VA Burkes Garden	37	5	81	20	2.02
VA Earle Hurst	37	40	80	14	1.80
VA Lynchburg	37	20	79	12	1.73
VA Pulaski	37	7	82	36	1.97
VA Radford	37	7	80	34	1.83
VA Roanoke	37	19	79	58	1.40
VA Staffordsville	37	16	80	43	1.88
WV Alexander	38	47	80	13	4.15
WV Bartow	38	31	79	46	2.79
WV Beckley	37	47	81	7	1.94
WV Bemis	38	49	79	44	2.70
WV Bluefield	37	18	81	12	1.69
WV Bluestone Dam	37	39	80	53	2.32
WV Buckeye	38	10	80	8	2.63
WV Buffalo	38	37	81	59	6.83
WV Cairo	39	12	81	9	4.32
WV Charleston	38	21	81	38	4.89
WV Clarksburg	39	18	80	14	3.41
WV Creston	38	57	81	17	5.12
WV Cross Lanes	38	26	81	46	5.92
WV Elkins	38	53	79	51	3.47
WV Fellowsville	39	20	79	50	3.33
WV Glady	38	48	79	43	3.48
WV Hamlin	38	17	82	6	5.56
WV Huntington	38	22	82	33	5.19
WV Mannington	39	32	80	20	4.00
WV Marlinton	38	13	80	5	2.66
WV Mullens	37	35	81	23	1.75
WV Oak Hill	37	59	81	9	2.73
WV Parkersburg	39	21	81	26	4.49
WV Parsons	39	6	79	14	2.87
WV Philippi	39	9	80	3	3.98
WV Pineville	37	35	81	32	1.71
WV Rock Cave	38	50	80	20	4.18
WV Romney	39	21	78	45	2.47
WV Rosedale	38	44	80	57	2.98
WV Sandyville	38	54	81	40	4.77
WV Spencer	38	48	81	21	6.23
WV Terra Alta	39	27	79	33	3.08
WV Union	37	35	80	33	1.50
WV Valley Head	38	33	80	2	3.07
WV Webster Springs	38	32	80	25	4.70
WV West Union	39	18	80	47	3.79
WV Weston	39	2	80	28	4.38

WV Wheeling	40	11	80	39	2.15
WV White Sulphur Springs	37	48	80	18	2.32
WV Williamson	39	24	81	27	2.82

Citing the article:

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