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NOAA TECHNICAL MEMORANDUM NWS NSSFC-19



SEVERE THUNDERSTORM CASES OF JULY 1986 THRU JUNE 1987

John E. Hales, Jr. and Hugh G. Crowther
National Severe Storms Forecast Center
Kansas City, Missouri 64106

April 1988

U.S. DEPARTMENT OF
COMMERCE

/ National Oceanic and
Atmospheric Administration

/ National Weather
Service

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UNITED STATES
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SEVERE THUNDERSTORM CASES OF JULY 1986 THRU JUNE 1987

JOHN E. HALES, JR.
HUGH G. CROWTHER

ABSTRACT

Severe thunderstorm occurrences are relatively infrequent in much of the United States. As a result a forecaster only occasionally has an opportunity to forecast their development. This proves to be a problem as certainly one of the more important factors in forecasting severe thunderstorms is the level of experience of the forecaster. Realizing the importance that experience plays and difficulty involved for a meteorologist to study past cases, a summary was compiled of all the organized severe thunderstorm episodes for the period from July 1986 to June 1987. Included in each case were the times and locations of the severe weather reported along with specifics of the more noteworthy events. A composite of those parameters most frequently found to be associated with severe thunderstorms was included. Each case has a surface and 500mb analysis along with an infrared satellite photo. The objective was to give an overview to a forecaster as to what ingredients went into severe development with a more detailed analysis being left up to the individual.

INTRODUCTION

More severe thunderstorms occur in the United States than in any other area in the world. Organized severe thunderstorm episodes can occur in any section of the country and in any month of the year. The synoptic conditions that result in the development of these storms vary widely across the country. Severe storm climatology shows the episode frequency decreasing with distance from the center of the country, however, only the Pacific coastal states lack a significant number of cases for any great concern.

One of the more important tools in forecasting severe thunderstorm episodes is experience. The more opportunities a forecaster has in working a severe weather situation, the greater his skill and confidence becomes. Unfortunately these episodes are infrequent enough that, with the exception of the most active areas in the central United States, an individual forecaster may only work a severe situation once or twice per year.

The usual technique for increasing ones experience base is to go back and examine the synoptic charts, particularly for cases with which the forecaster was not previously involved. This can be a

rather difficult undertaking because charts of interest may not be readily available and/or organized in a systemic manner. This is the case at the NSSFC, but it is often so to a much greater extent at the local field offices.

The purpose of this publication is to identify and organize those severe thunderstorm episodes that occurred across the nation for the period from July 1986 thru June 1987 into a handy and easy to use format such that a forecaster can readily review those cases that may be of interest to him. The selection procedure of the cases was not very restrictive and included most of the organized severe thunderstorm episodes that occurred nationally. In those areas where storms are rather infrequent, such as west of the Rocky Mountains, the selection threshold was somewhat lower.

CASE FORMAT

The basic approach in compiling the cases was to provide the interested forecaster with a comprehensive, but not excessive, number of charts. The following is a description of each chart included.

Daily Activity Summary-A fairly tight depiction of the day's organized severe convection is shown(solid line). A listing of any noteworthy individual event is included for each day. The criteria for listing a report would be most of the F2(Fujita 1981) or greater tornadoes, tornadoes/wind damage that result in death, a significant number of injuries and/or damage that generally exceeds \$100,000. Storms that resulted in damage in excess of about \$100,000 were included in the listing by category as used in Storm Data(U.S. Dept. of Commerce 1986 and 1987). Those reports were then located on the activity summary chart by number. Also included is a table listing the daily total of severe reports. Following the date there is included the time range of the organized severe occurrence. All times for this chart were in CST.

Composite Chart-The purpose of a composite is to represent on one chart those parameters important in producing severe thunderstorms. The basic composite is similar to that done in TR-200(e.g., Miller, 1972) with some modifications. Instead of using the 850 Td, the mean mixing ratio(solid line g/kg) was incorporated as a better representation of the low level moisture supply. The relevant short wave trough(line of triangles) was taken from the 700 mb level rather than 500 mb. This was done for two reasons a)the 500 mb analysis being included in the study and b) a more frequent correlation of troughs at 700 mb with severe thunderstorm development. The polar and subtropical jet-stream is depicted by the maximum wind axis(wide solid line with arrowhead in kts) at the 250 mb level. The lifted index analysis(dashed

line) used the lower 100 mb of moisture and a forecasted maximum surface temperature. Any areas of upper difffluence(zig zag line) and mid level drying(heavy dashed line), as well as the low level jet(line with arrowhead in kts), as shown on the 850 mb analysis, are included.

500 mb Analysis-The NMC operational 500 mb analyses using the observation time most relevant to the severe thunderstorm development was included.

Satellite Photo-The infrared photo closest to the time of the most severe storm occurrence of the day was included.

SUMMARY

The details of synoptic patterns that are associated with severe weather events are soon forgotten. However similar, a severe weather situation seems to an earlier occurrence, there are always important differences. Having available the pertinent synoptic conditions that were present in a past situation should enable a forecaster to better identify future storm producing patterns.

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Hales, J.E., and Crowther, H.G., 1985: Severe Thunderstorm Cases of 1984, NOAA Tech Memo NWS NSSFC-7, Kansas City, MO, 88pp.

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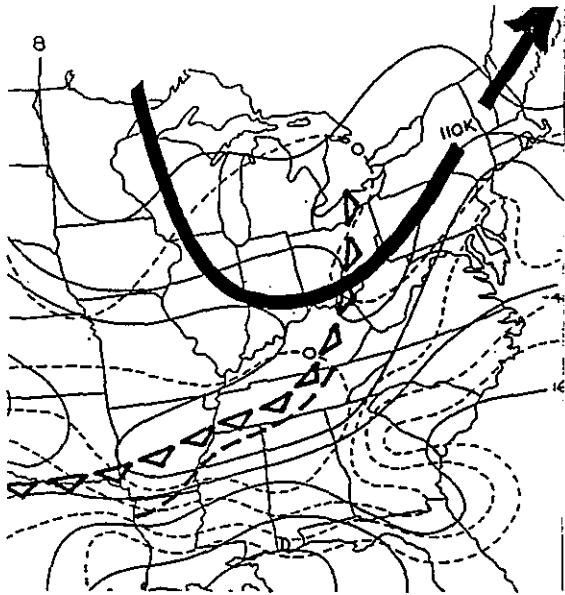
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Miller, R.C., 1972: Notes on analysis and severe storm forecasting procedures of the Air Force Global Weather Central. Air Weather Service Tech. Report 200(Rev.), Headquarters AWS, Scott AFB, IL, 94 pp.

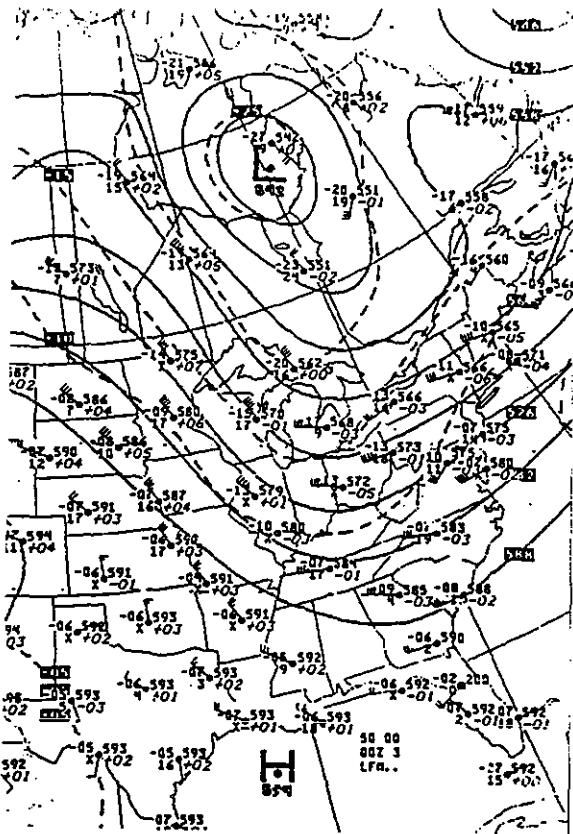
1. July 2, SC NC
2. July 4, WY WI MI
3. July 9, CO NE WY VA NC OH MD
4. July 10, KS MO IL
5. July 11, NE
6. July 12, NC TX OK KS MO MN WI
7. July 13, NY IA NE
8. July 14, AZ
9. July 18, SD MN WI PA NY NJ
10. July 20, OH KY WV VA MD PA AZ NV CA
11. July 24, NE CO IA MN WI MI
12. July 25, IN OH MI IL
13. July 26, ND SD MN GA SC NC VA WV
14. July 27, ND SD MN NE WI IA
15. July 28, SD NE MN IA MO IL
16. July 29, SD ND MT MN NE IA NY NJ PA MA CT VT
17. July 31, AR MO IL IN KY TN MS AL GA NE CO KS
18. August 1, KS OK MO AR
19. August 2, WY CO NE
20. August 6, SD NE KS
21. August 7, NY PA NJ CT MA RI ME VT NH
22. August 8, NH VT MA CT RI ME
23. August 26, IN OH MI
24. September 10, WI MI KS CO
25. September 18, WY CO NE KS IA
26. September 26, MN IA WI IN IL MI OH PA KS OK
27. September 28, NE KS IA MO IL WI MI IN
28. September 29, TX OK MI IN IL OH
29. October 1, TX OK MI IN OH PA OK
30. October 2, TX OK MO IL IN
31. October 9, AZ
32. October 14, VA
33. November 18, AZ
34. November 20, LA MS AL GA FL
35. November 26, AL
36. February 14, TX OK AR LA
37. February 15, LA MS AL TN
38. February 27, TX OK AR LA MS AL
39. March 16, TX OK
40. March 17, TX LA MS AL
41. March 27, TX OK
42. March 30, NC
43. April 13, TX OK MO AR IL LA MS
44. April 15, NC SC FL
45. May 3, TX OK KS MO AR
46. May 21, TX OK KS MO AR IA WI IL IN MI
47. May 22, NM TX
48. May 25, KS OK TX NM CO
49. May 28, TX OK

50. May 29, NM TX
51. June 2, TX OK KS MO AR IL MI IN OH KY TN
52. June 15, OR ID MT WY
53. June 17, WY CO NE KS OK TX AR LA
54. June 19, TX OK AR LA
55. June 23, WY CO NE KS OK TX AR LA
56. June 24, CO NM NE KS TX OK IA MO
57. June 27, NE KS MO
58. June 29, TX OK MI IL IN OH PA

No. 1 July 2 1986

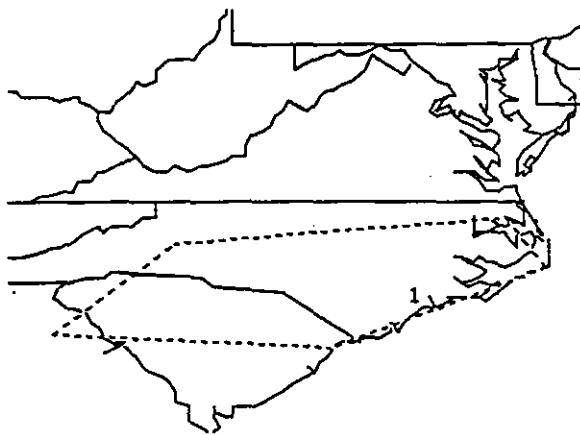


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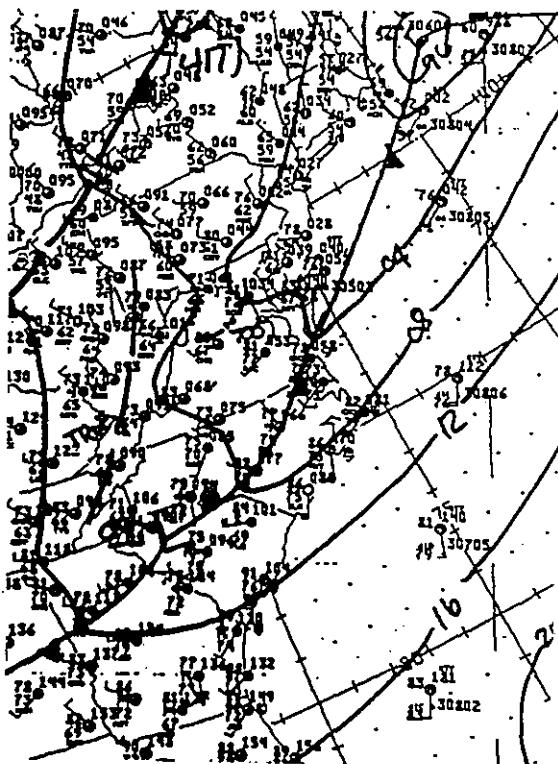


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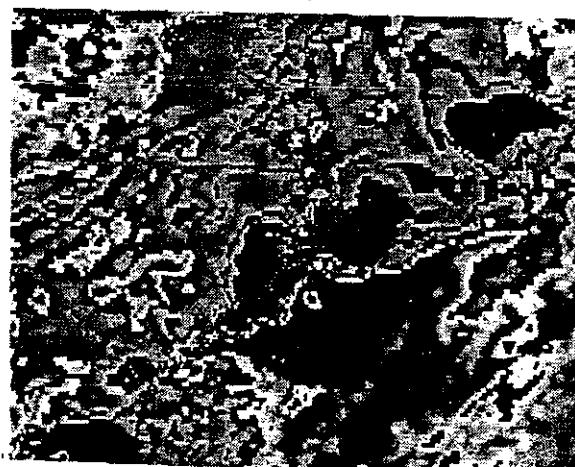
1 1830 CST F-2 TORNADO JACKSONVILLE NC KILLS 3 INJURES 10

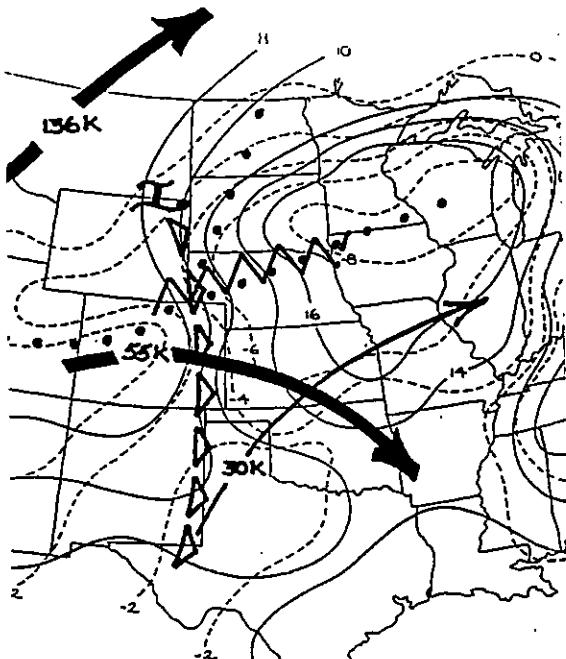


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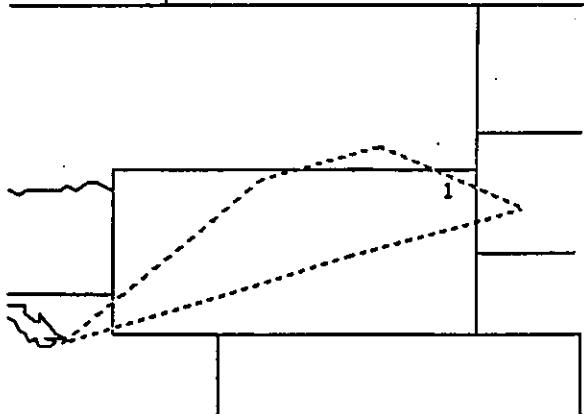


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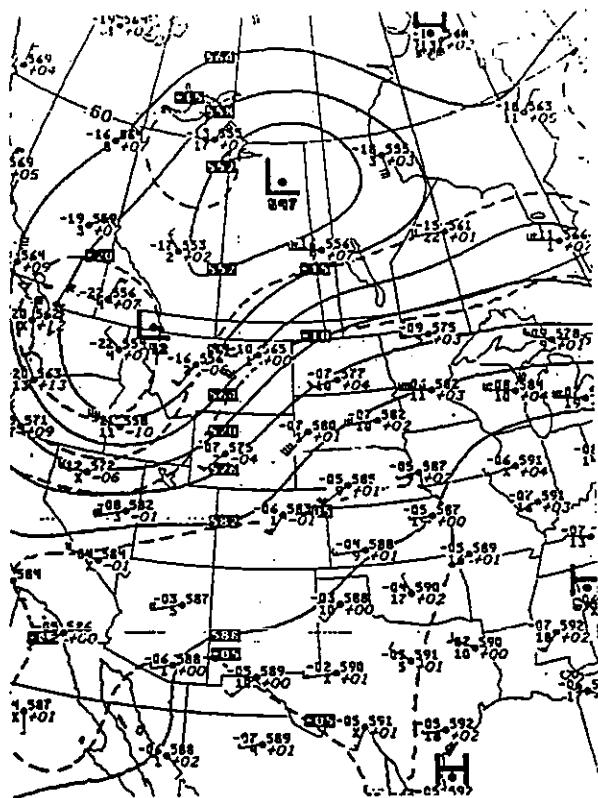


1 1800 CST F-1 TORNADO ALBION NY

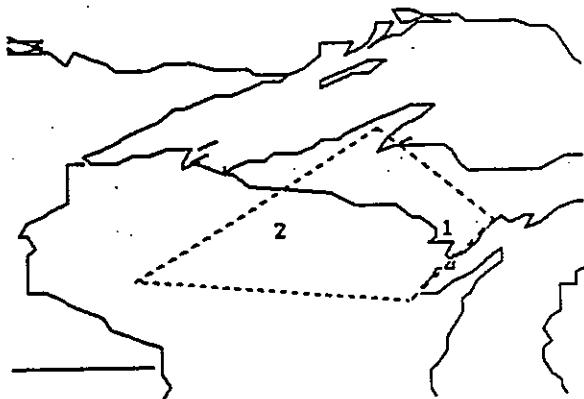


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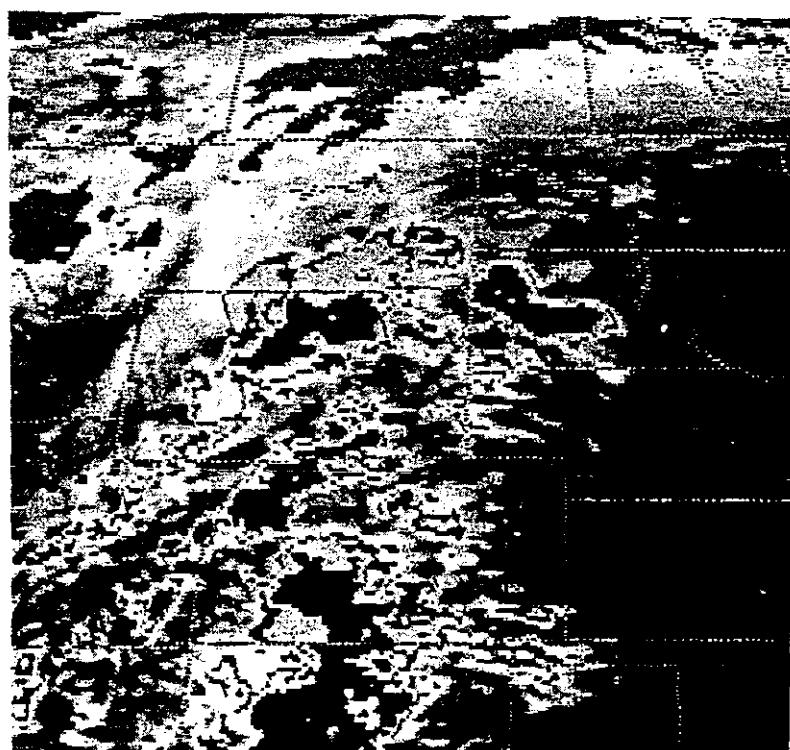
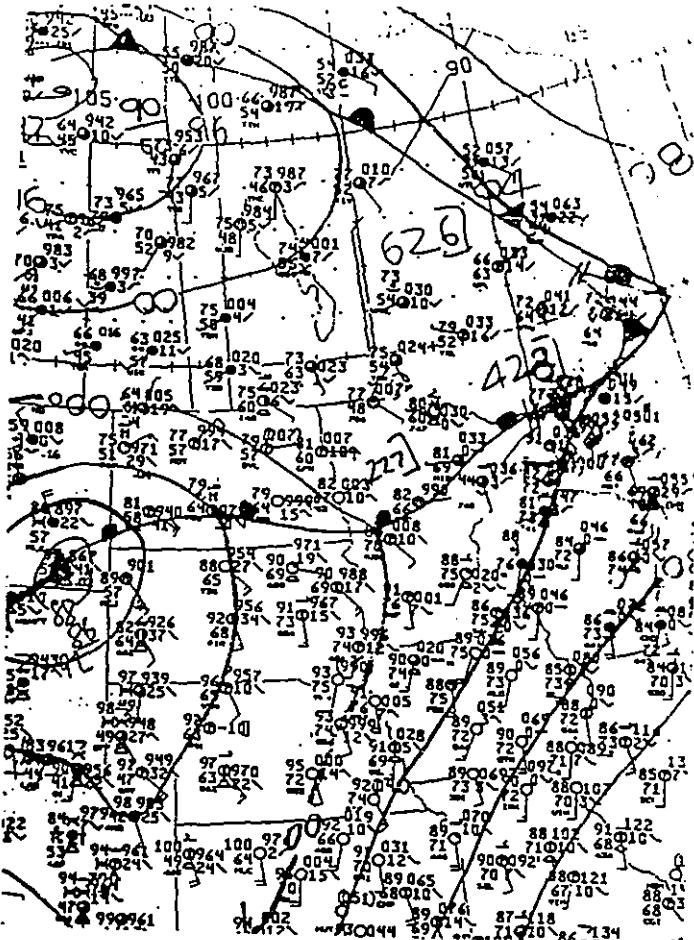
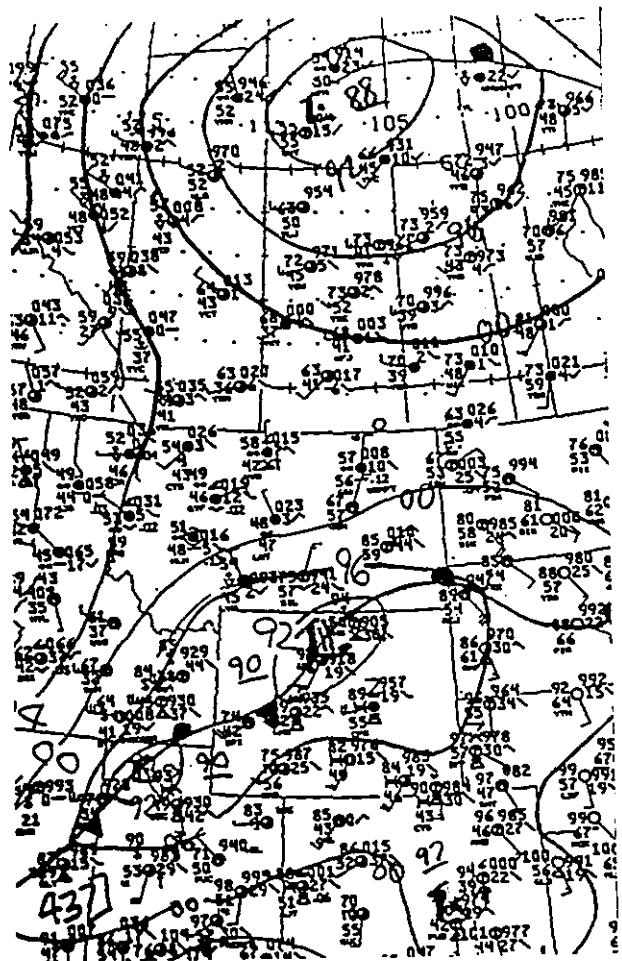


1 1800 CST F-3 TORNADO FRETHORN KS INJURES 12
2 1830 CST F-2 TORNADO HAZELHURST KS



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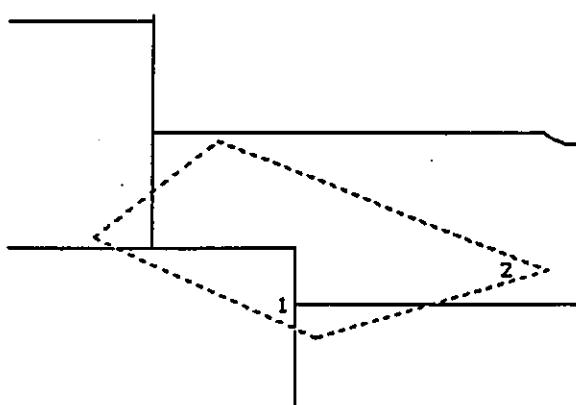
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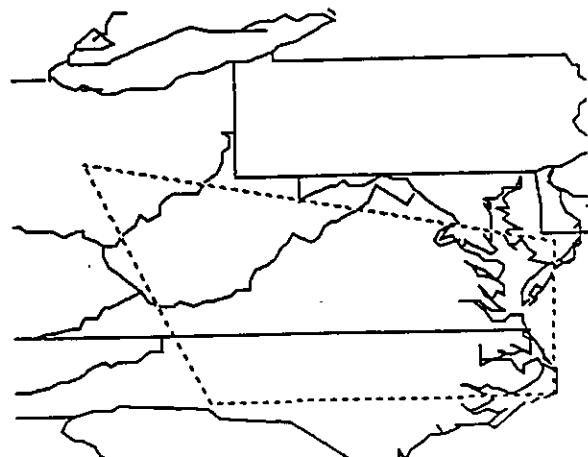
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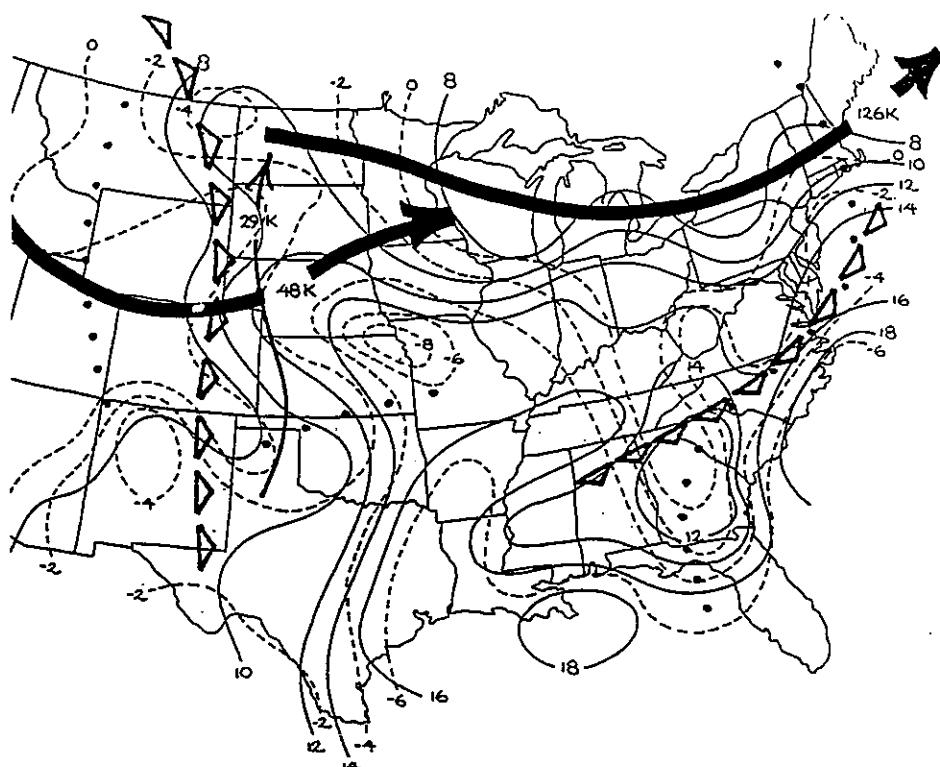
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2 2100 CST 100 MPH WIND GUST KIRKNEY NE



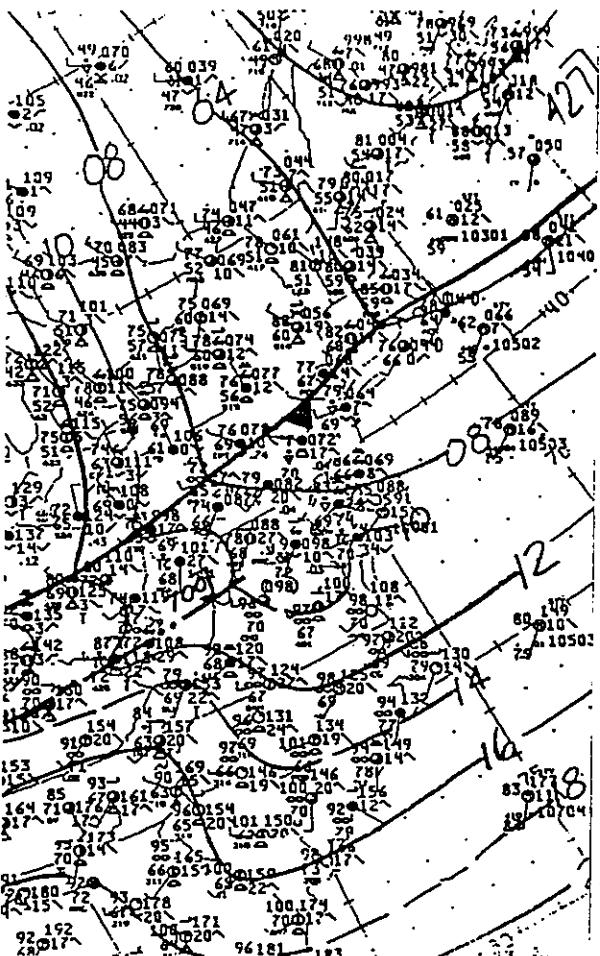
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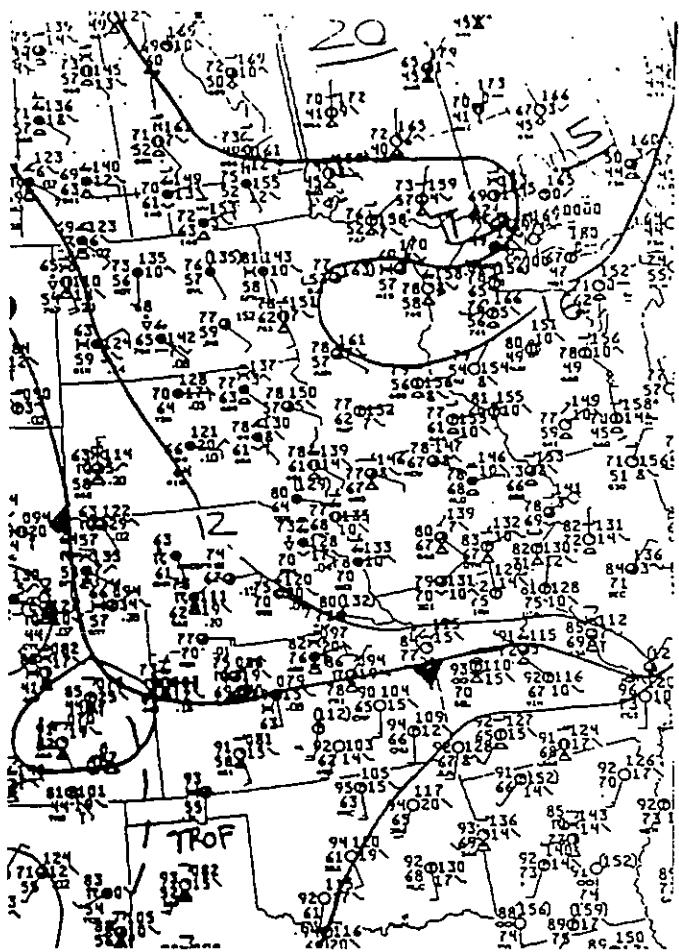
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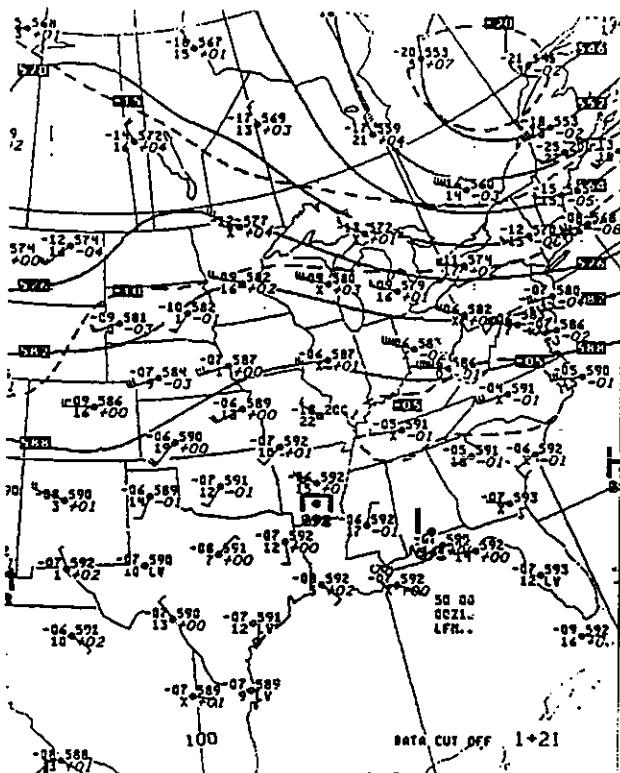
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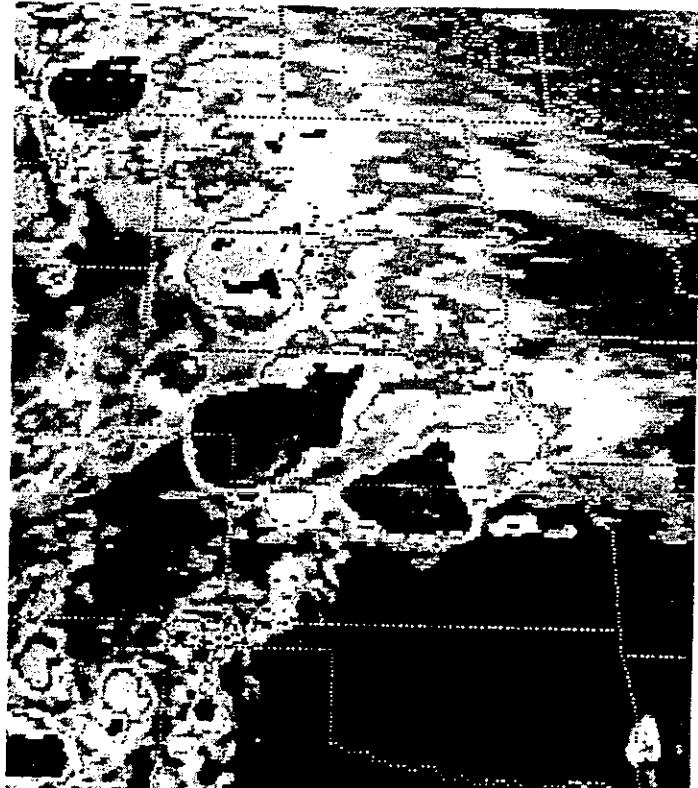
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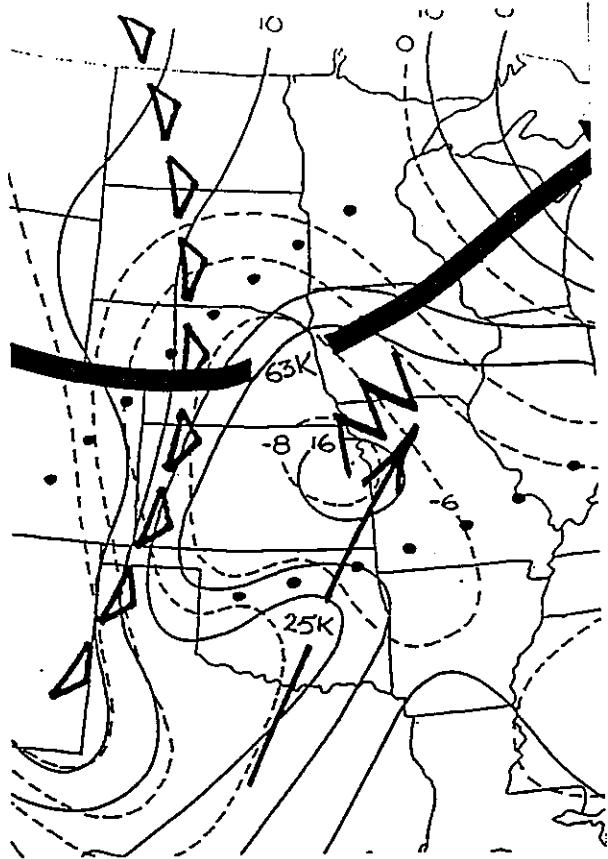
Surface 6PM CST July 7, 1986



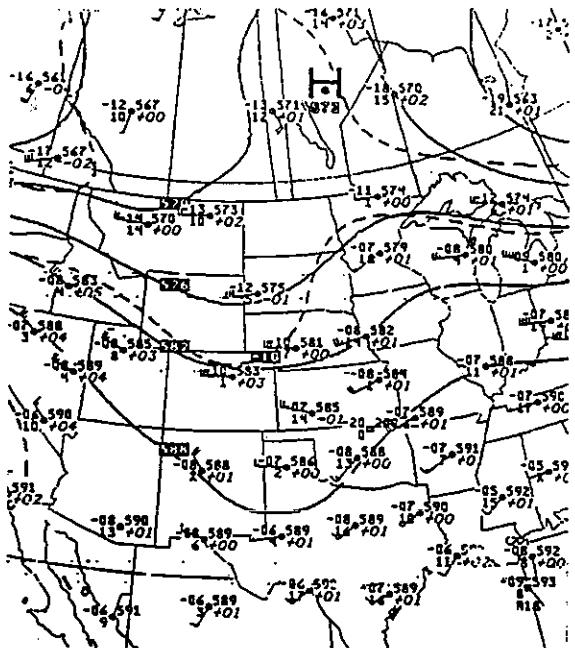
500 MB 6PM CST July 9, 1986



GOES 6PM CST July 9, 1986

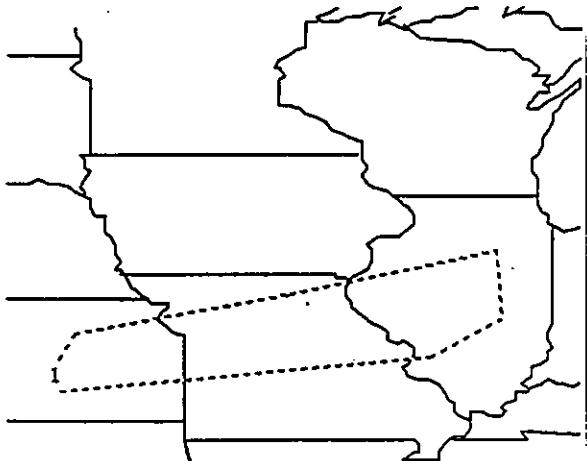


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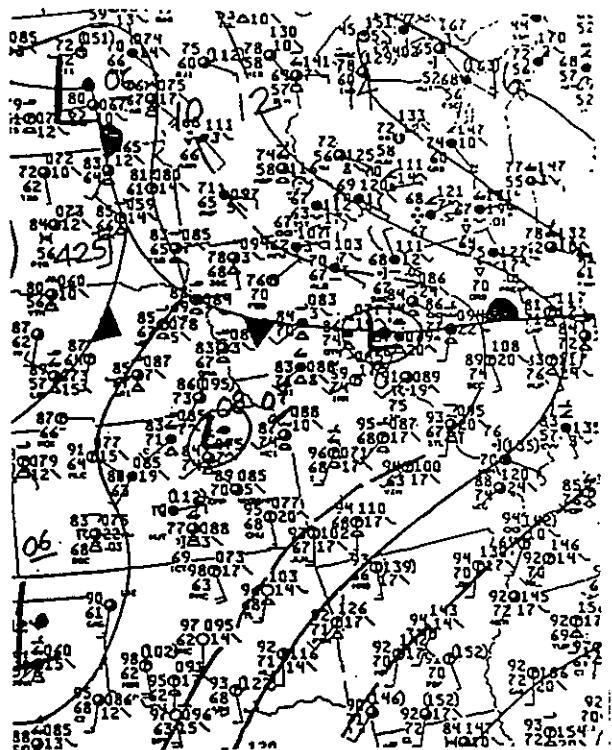


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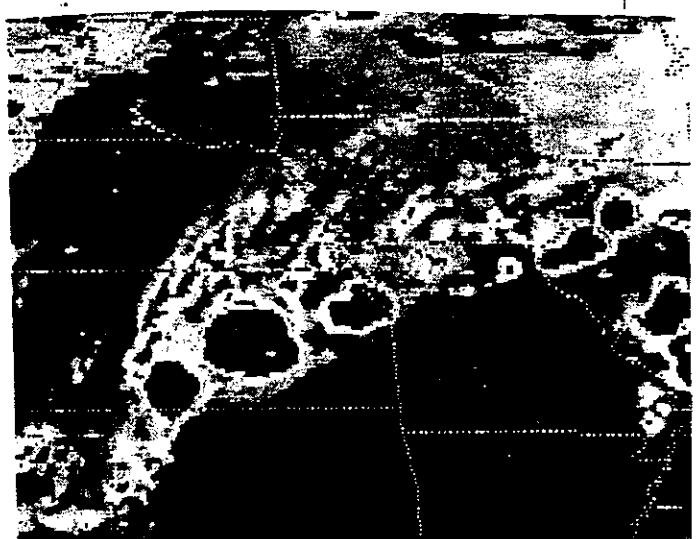
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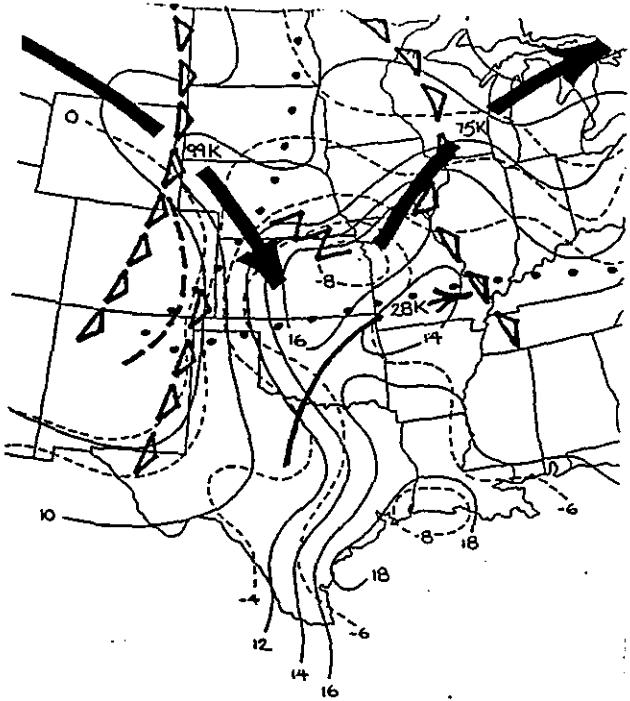
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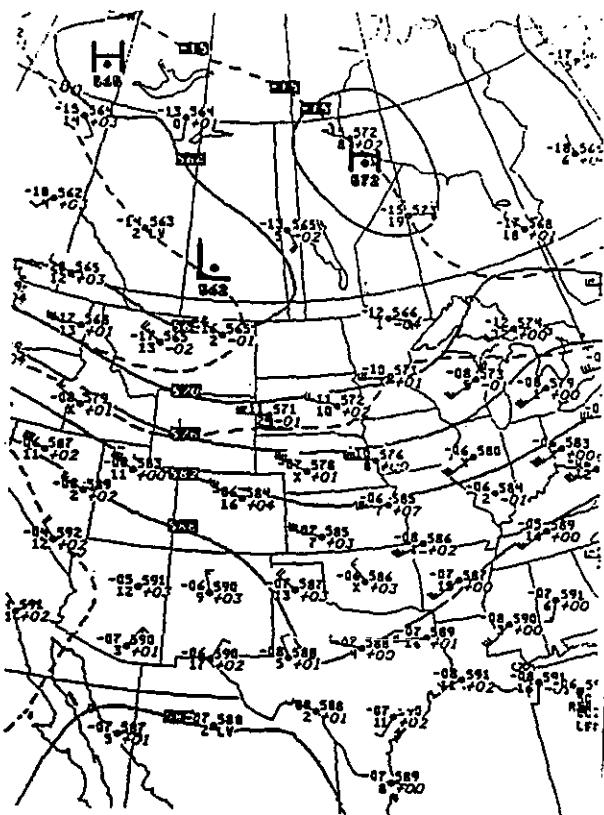
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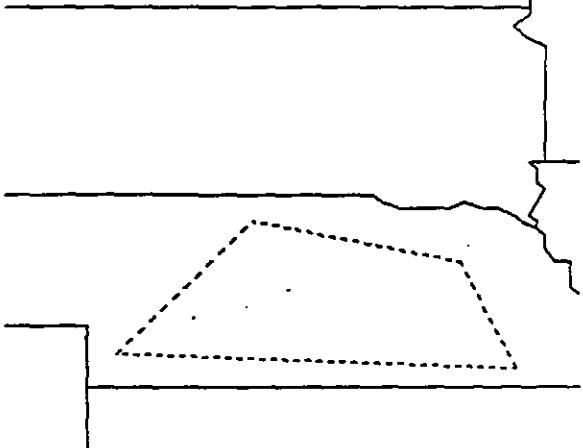
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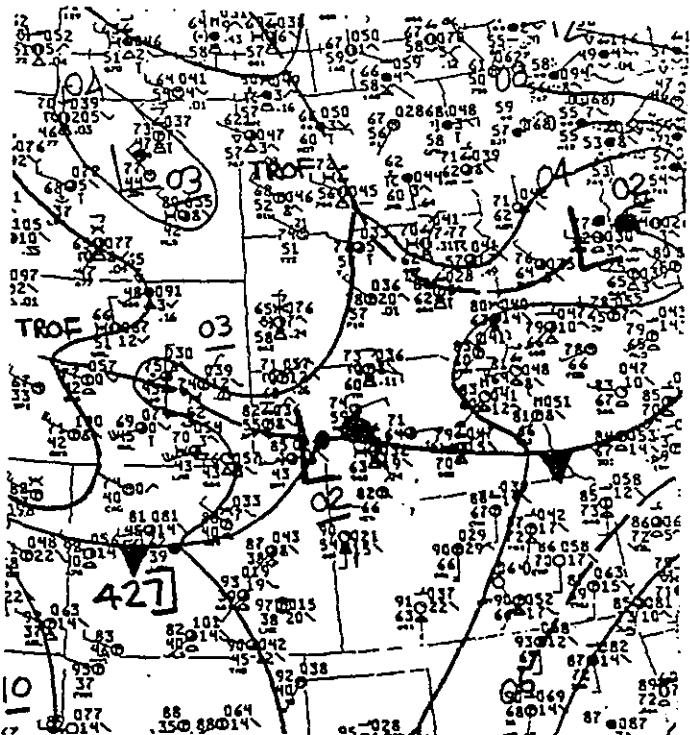
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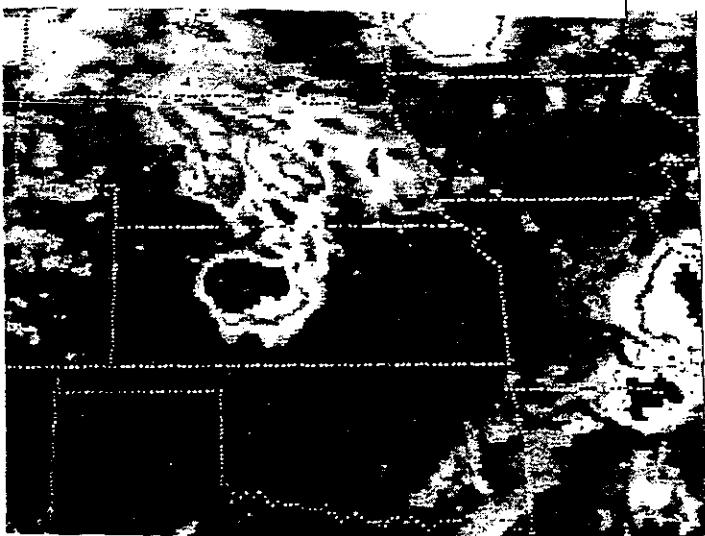
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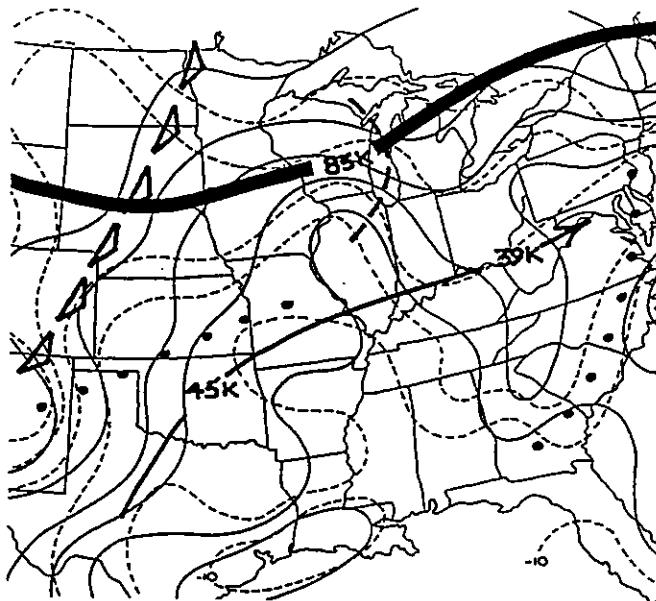
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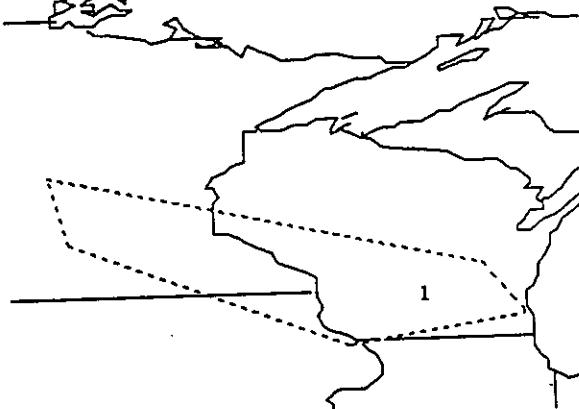
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12JUL86 1220-1945 CST 8 REPORTS

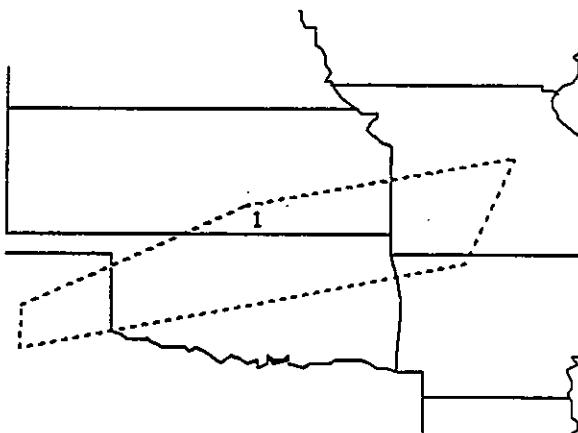
1 100 FT 1.75 INCH HAGL. PORTAGE WI \$0.8 MILLION DAMAGE

Composite 6AM CST July 12, 1986

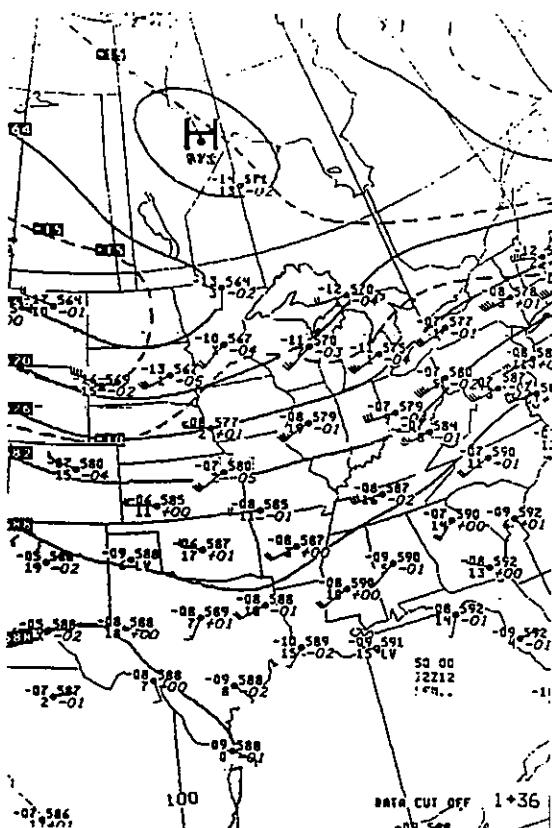


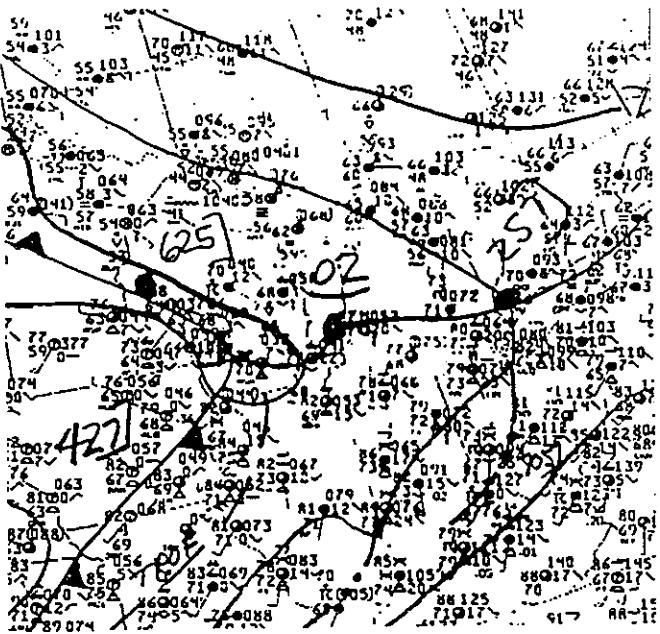
12 JUN 86 1318-1940 CST 17 REPORTS 3 TORNADOES

1 0313 CST 76 MPH WIND GUST MULYRINE KS

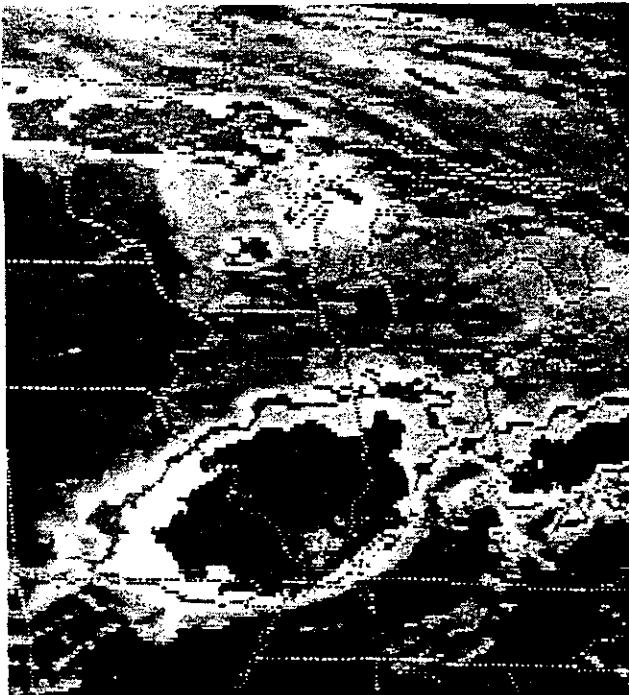


12 JUL 86-13 JUL 86 1737-0315 CST 16 REPORTS 1 TOEWS000

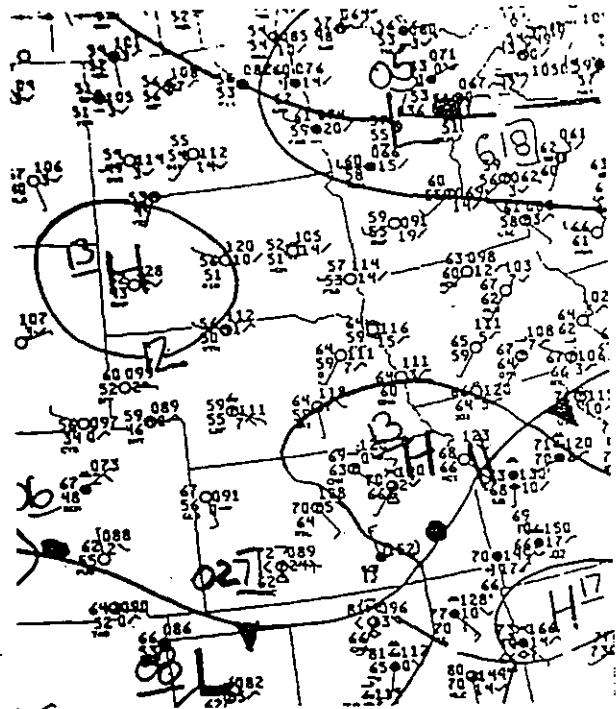




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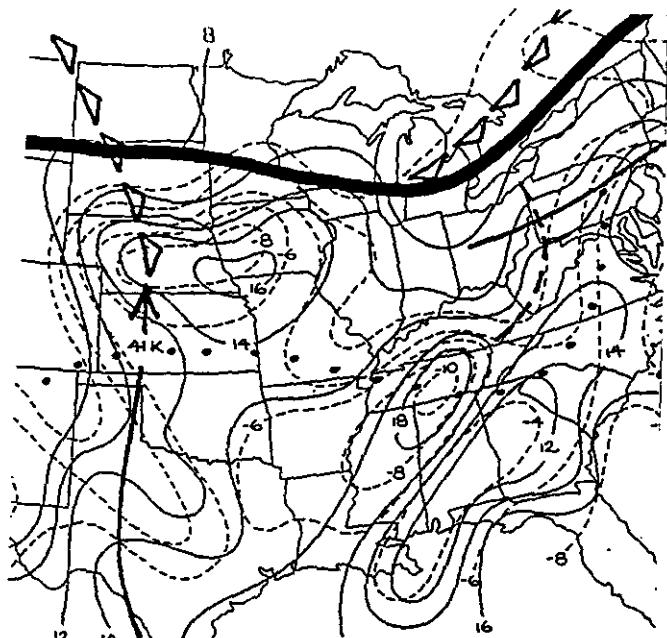


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Surface 3AM CST July 13, 1986

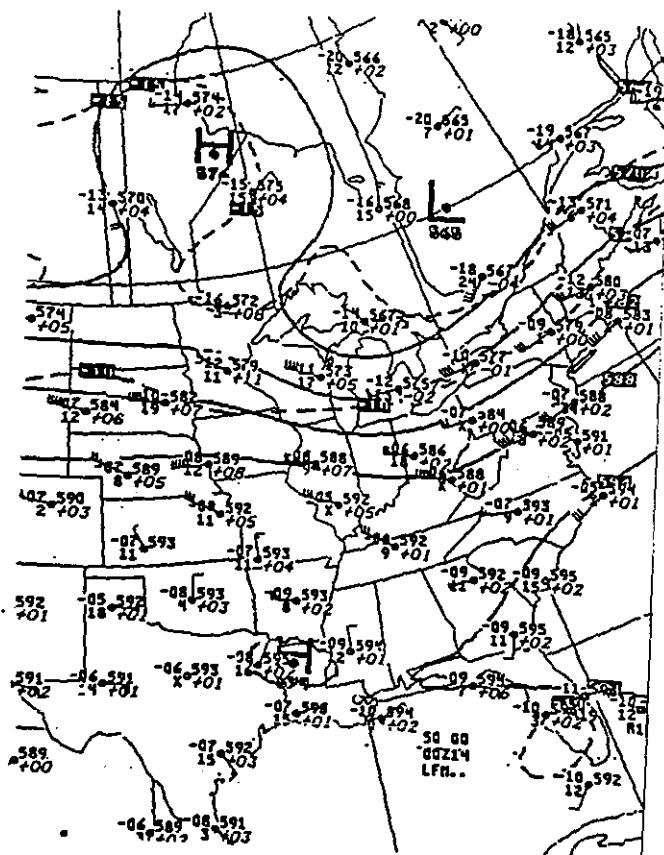
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1 1625 CST F-1 TORNADO FULTON NY INJURES 3

13JUL86 1310-1640 CST 6 REPORTS 1 TORNADO

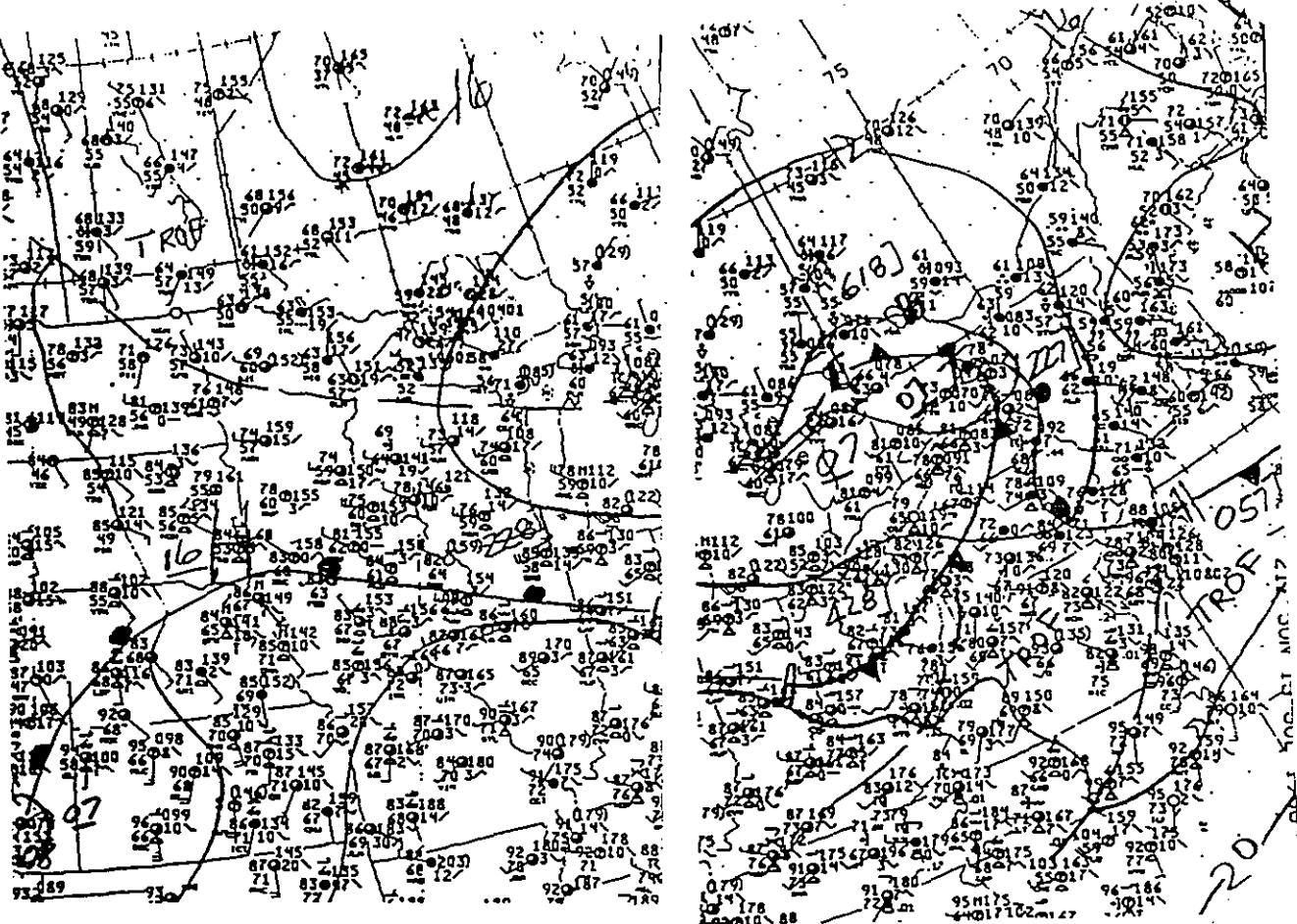
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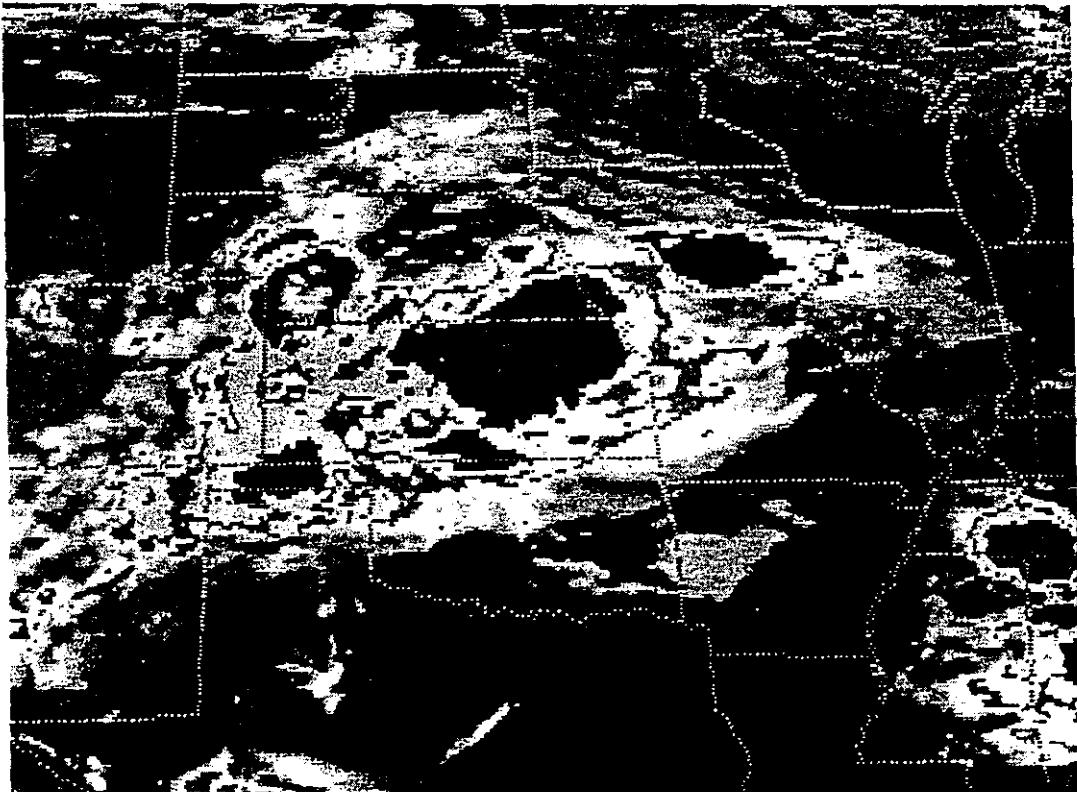
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3 JUL 86-14 JUL 86 1915-0005 CST 8 REPORTS 2 TORNADOES

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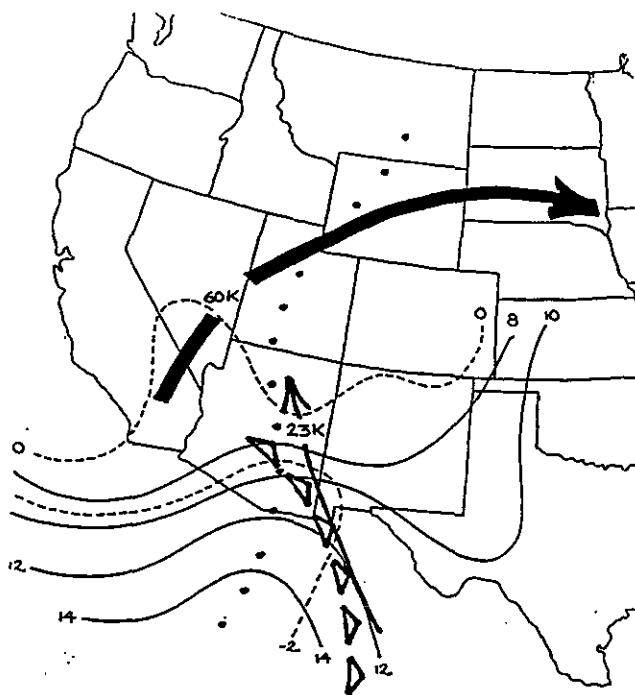


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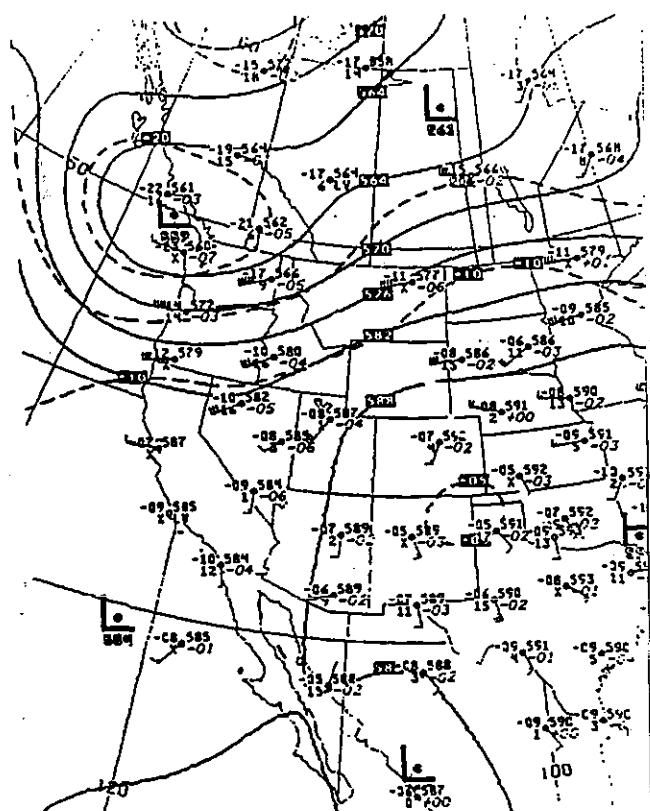


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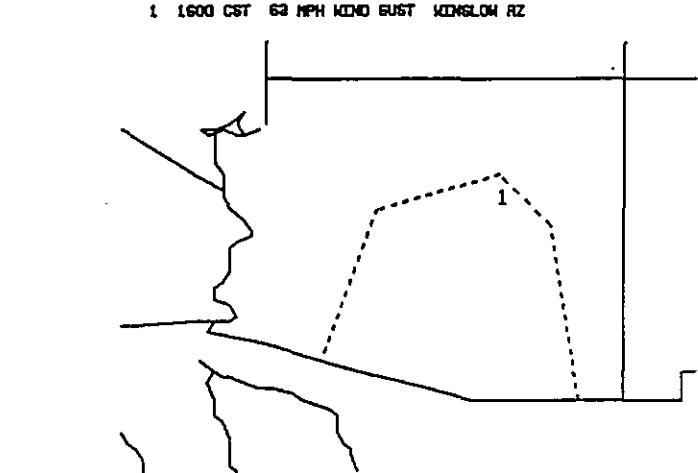
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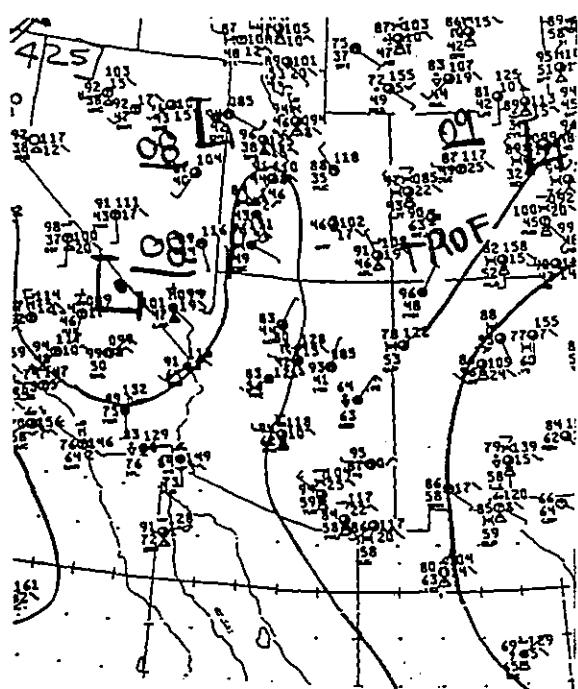
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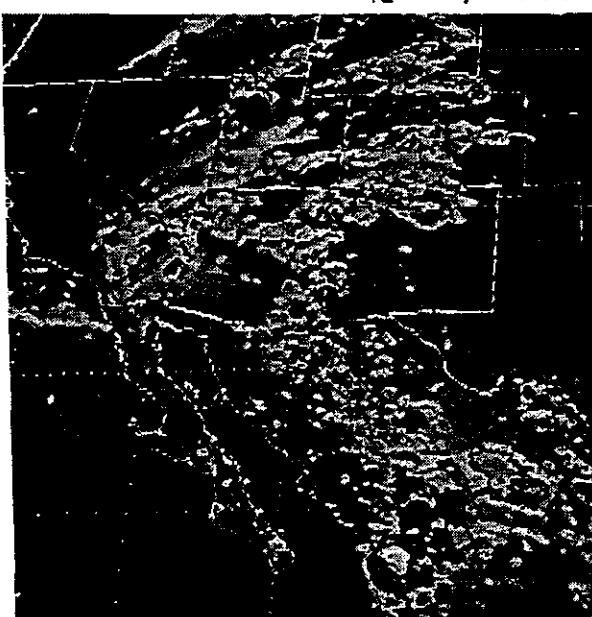
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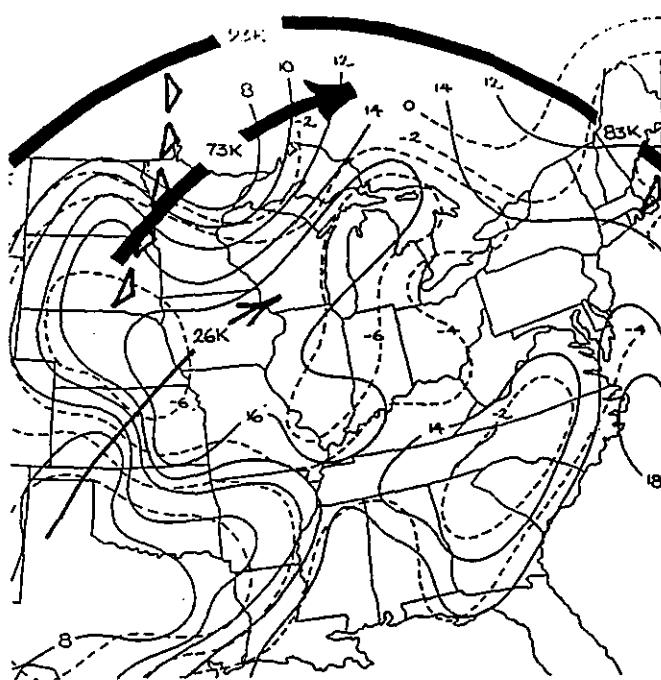
14JUL86 1600-1800 CST 3 REPORTS



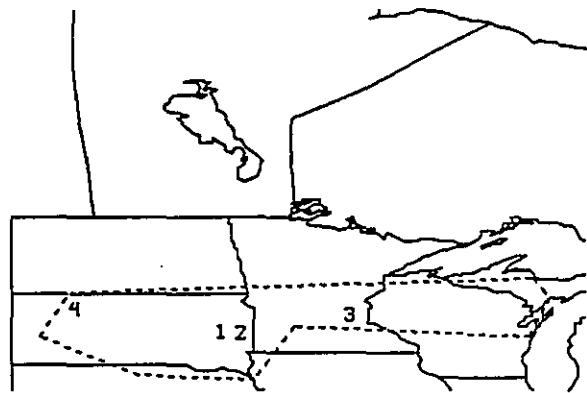
Surface 3PM CST July 14, 1986



NO. 9 July 18 1986

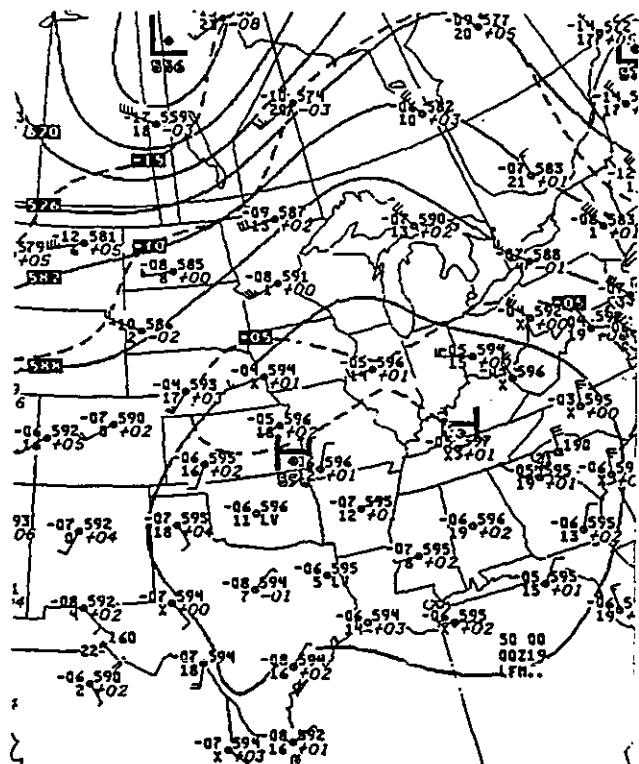


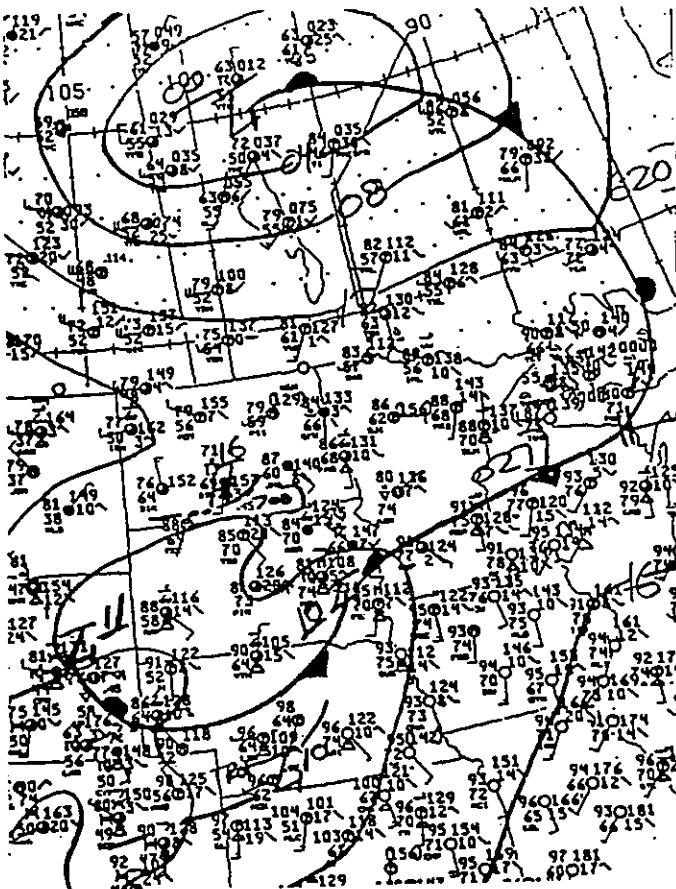
1 1443 CST F-2 TORNADO BRYANT SD
 2 1538 CST F-2 TORNADO TORONTO SD
 3 1547 CST F-2 TORNADO MINNEAPOLIS MN
 4 1600 CST F-2 TORNADO MEADOW SD



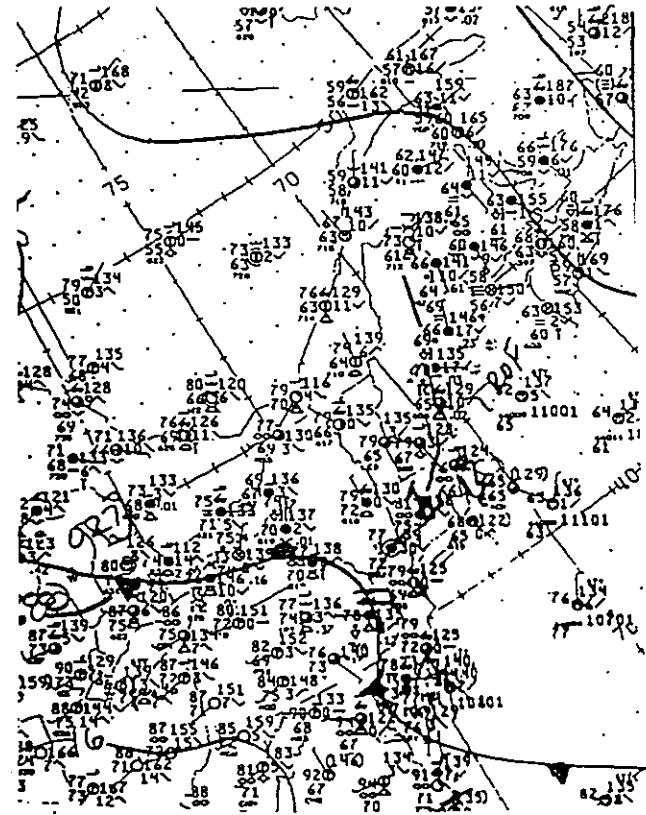
18JUL86-19JUL86 1210-0200 CST 39 REPORTS 5 TORNADOES

Composite 6PM CST July 18, 1986

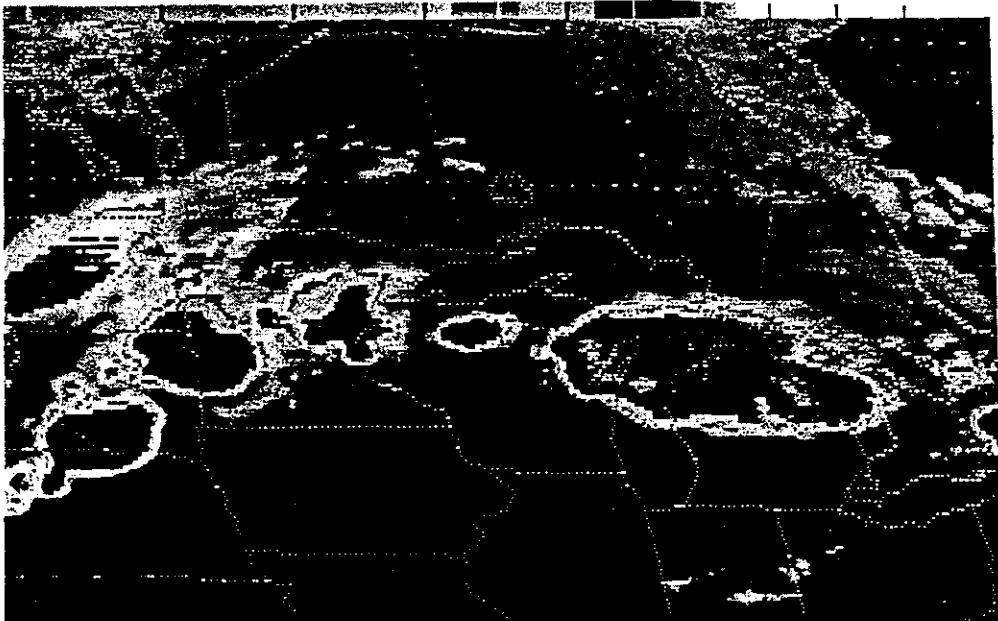




Surface 3PM CST July 18, 1986

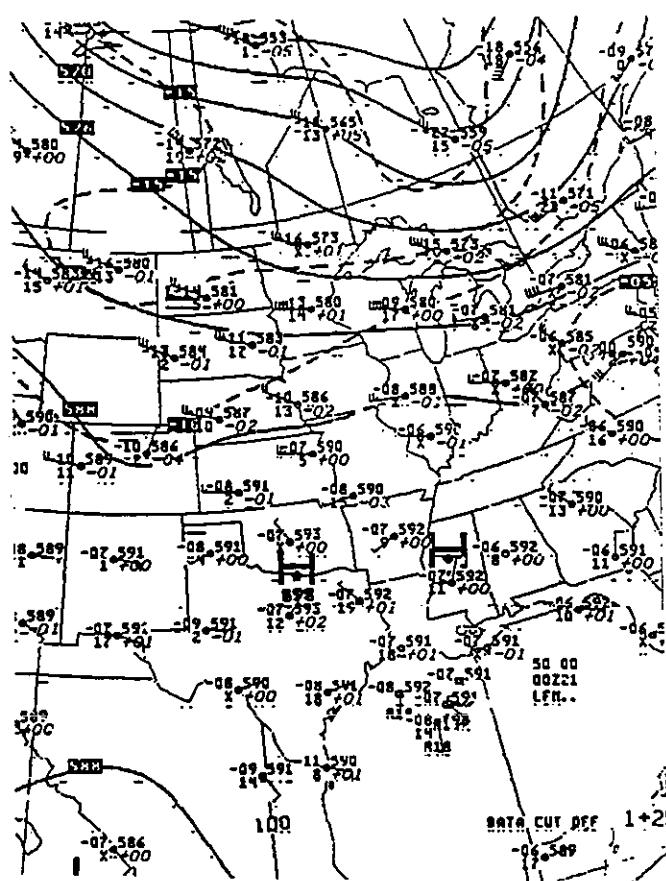
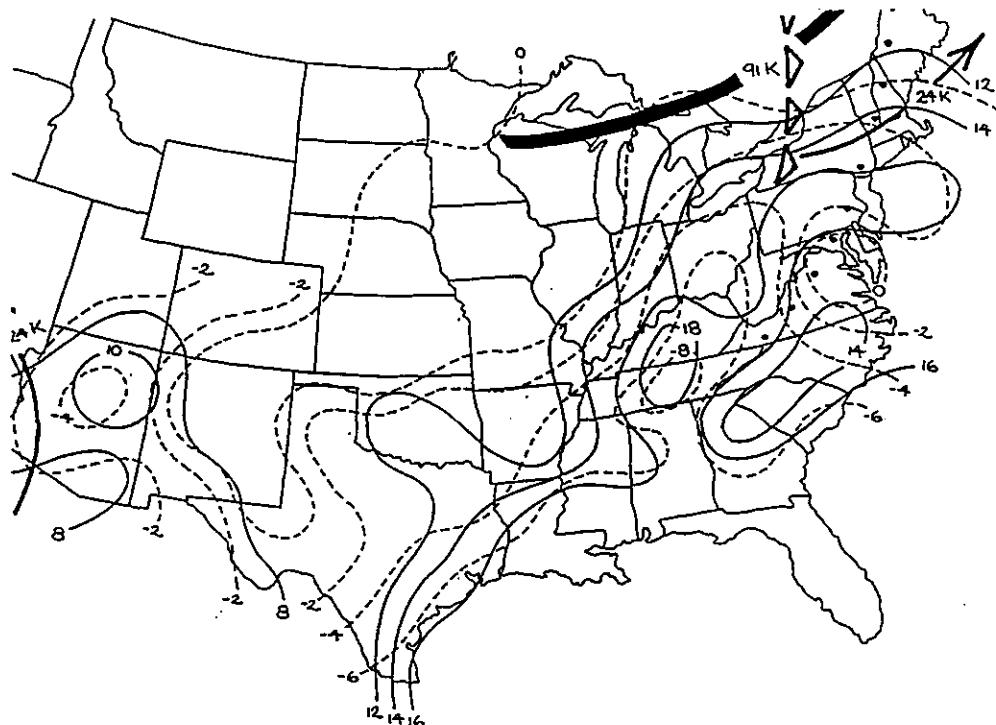


Surface 6PM CST July 18, 1986

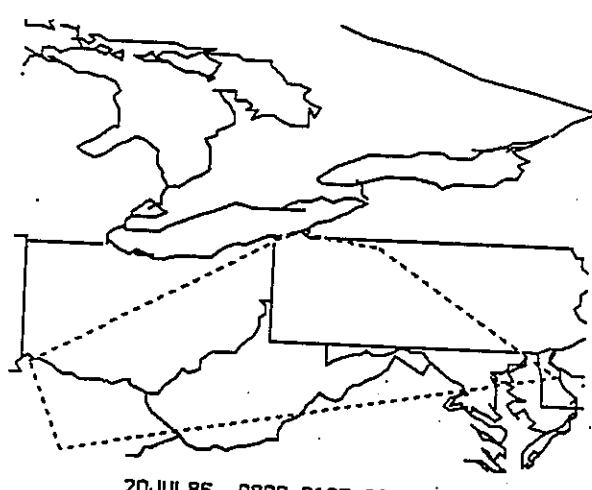


GOES 401PM CST July 18, 1986

No. 10 July 20 1986

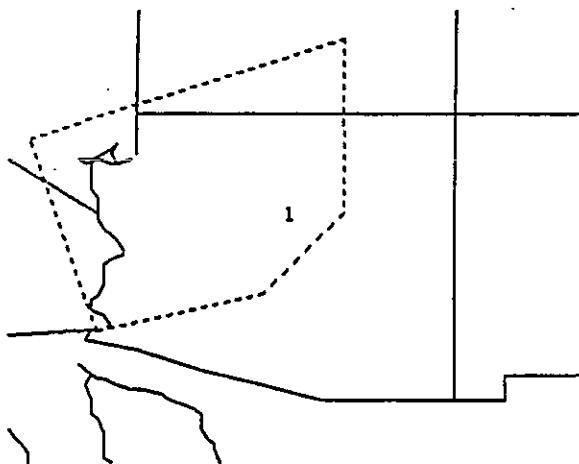


500MB 6PM CST July 20, 1986

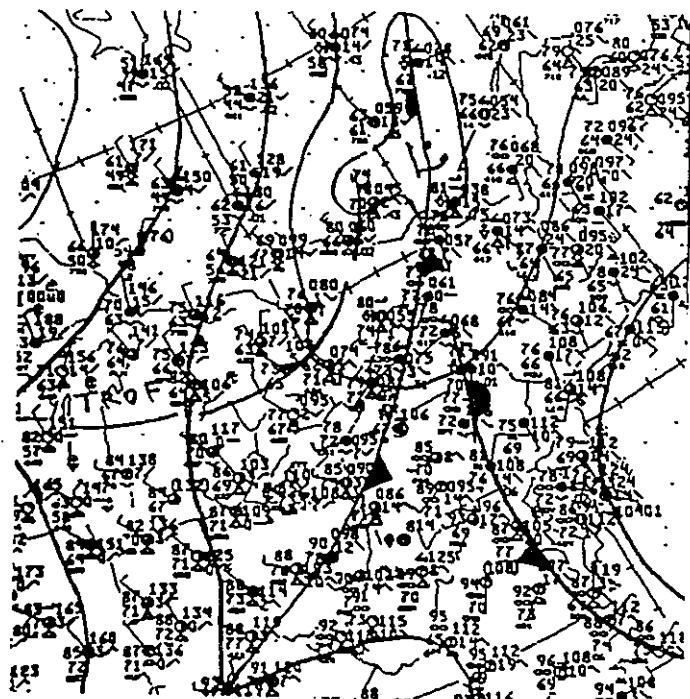
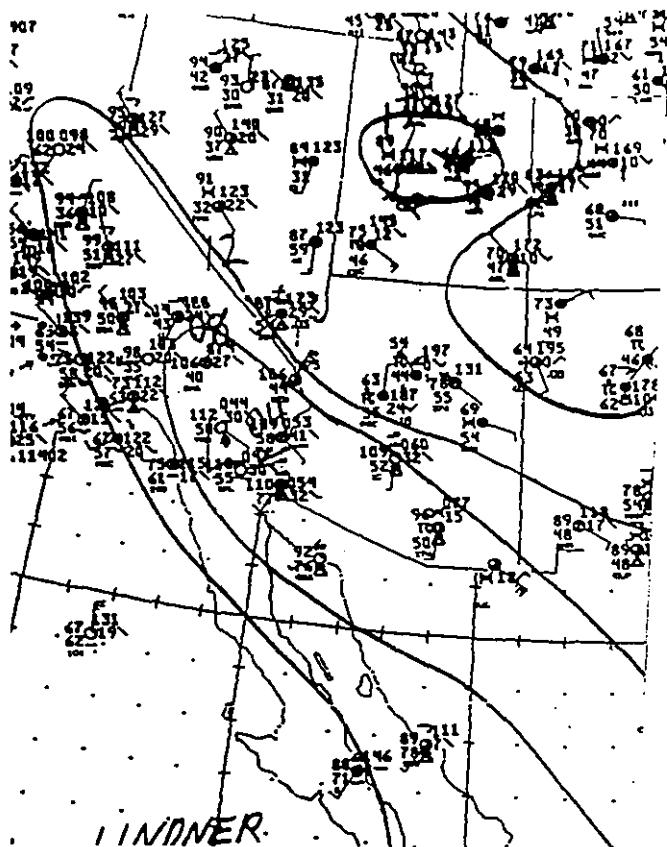


20JUL86 0800-2105 CST 52 REPORTS

1 1700 CST 1.50 INCH NAIL FLAGSTAFF AZ

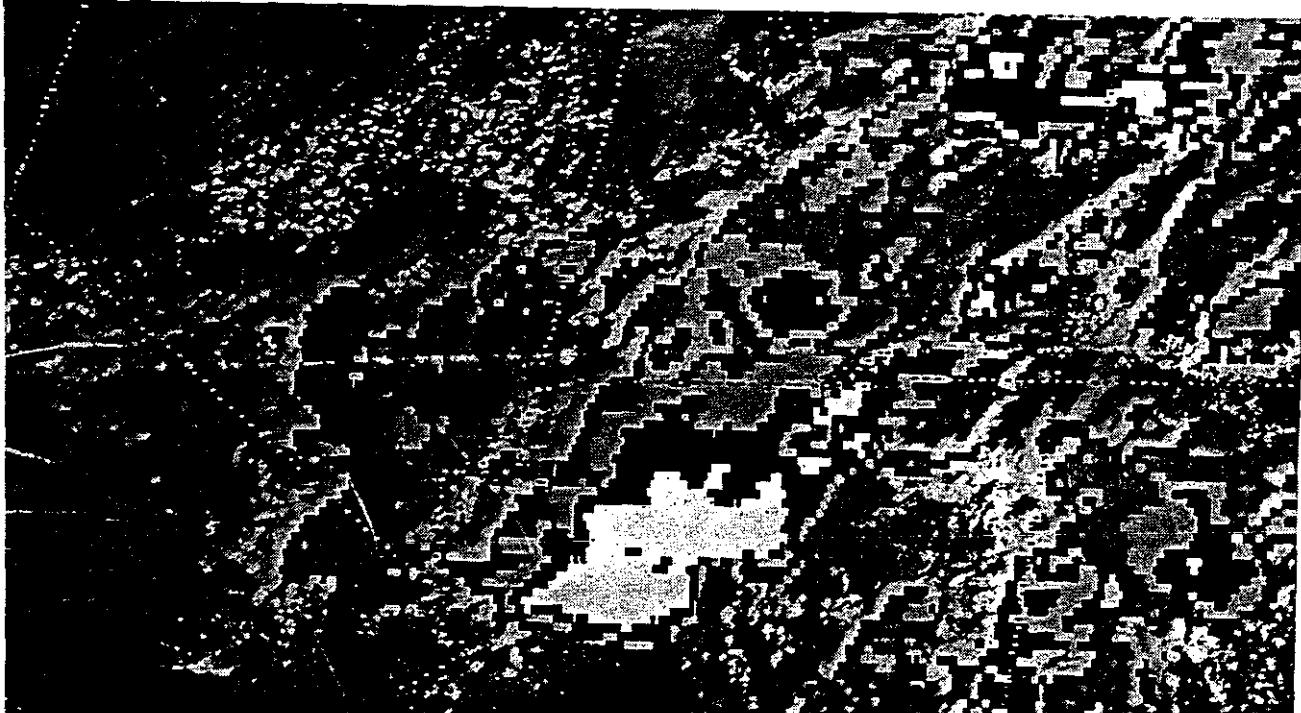


20JUL86 1215-1700 CST 4 REPORTS

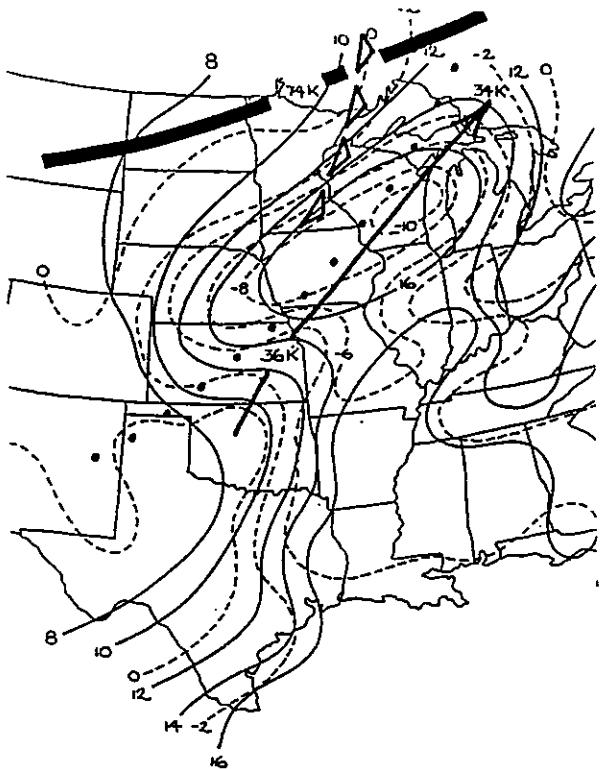


Surface 12 Noon CST July 20, 1986

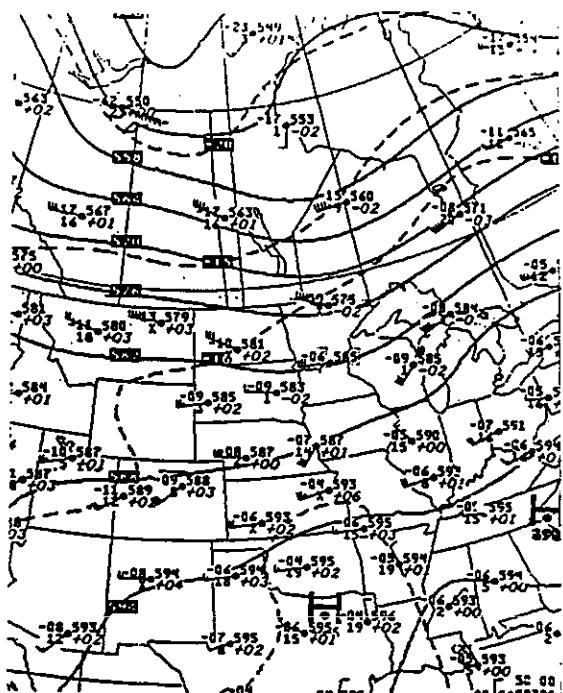
Surface 6PM CST July 20, 1986



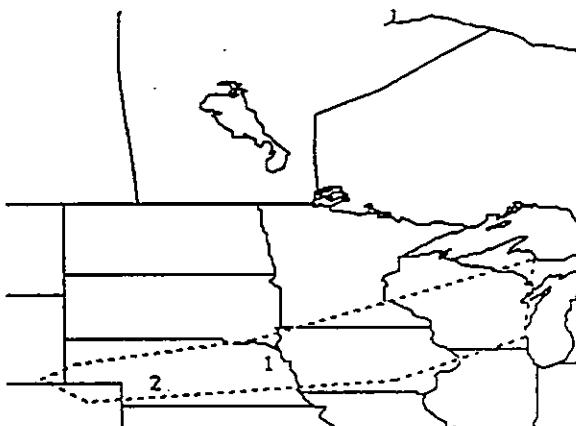
GOES 5PM CST July 20, 1986



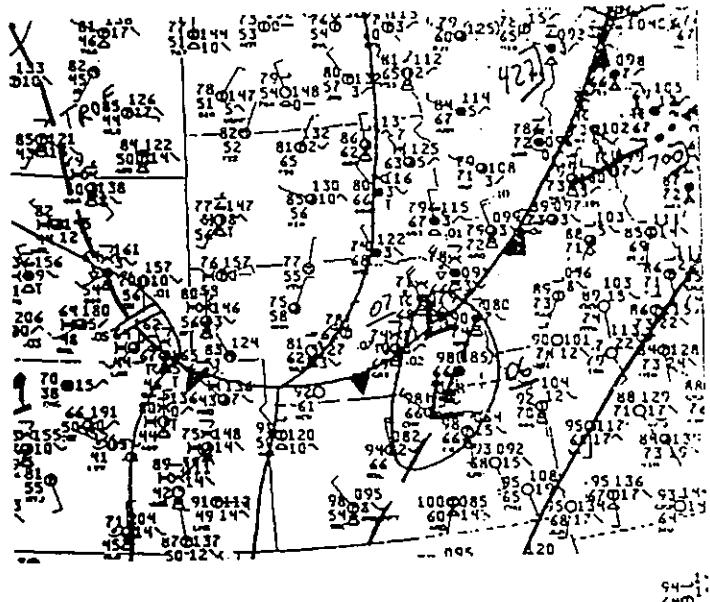
Composite 6PM CST July 24, 1986



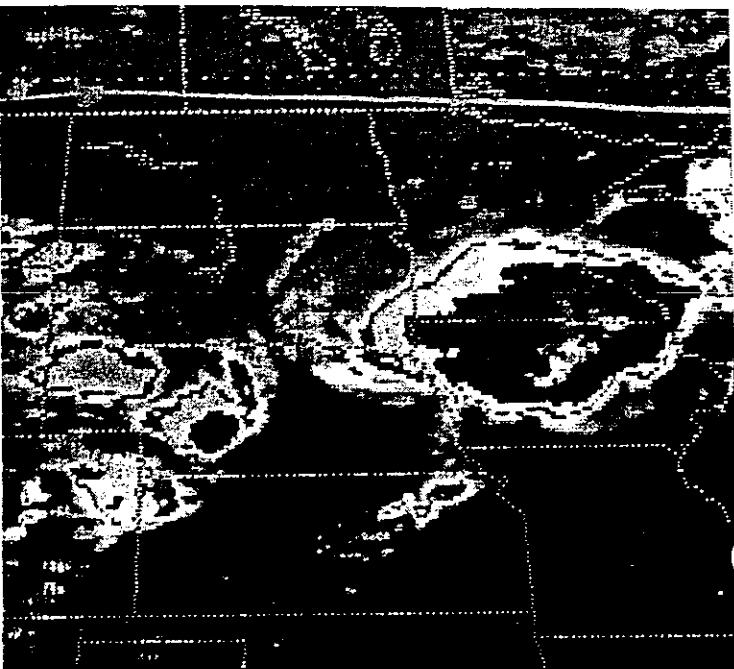
1 1700 CST 80 MPH WIND GUST WAYNE NE
2 2100 CST 2.30 INCH HAIL MCCOOK NE INJURED 2 10.3 MIL DMG



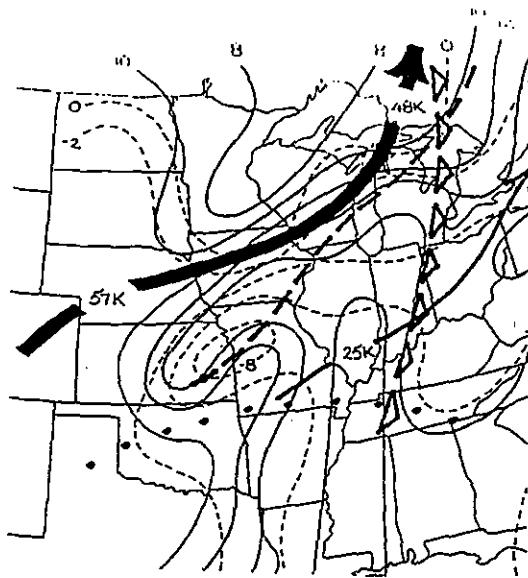
24JUL86-25JUL86 1415-0018 CST 43 REPORTS 3 TORNADOES



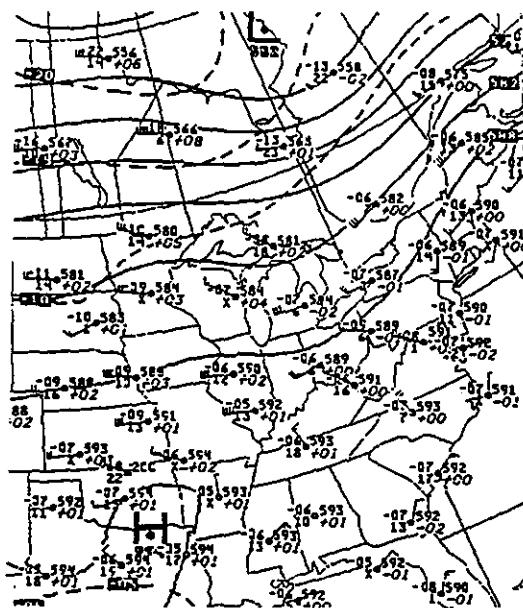
Surface 6PM CST July 24, 1986



No. 12 July 25 1986

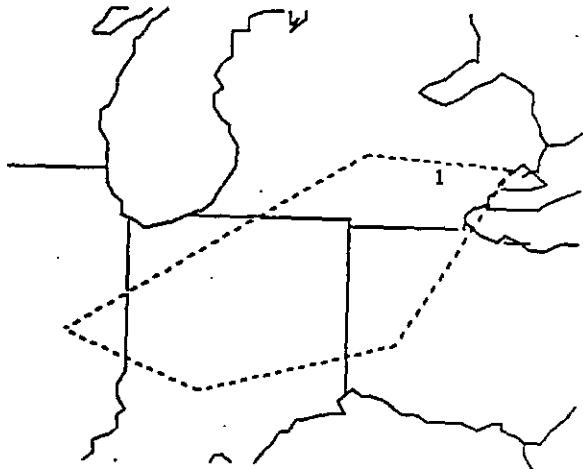


Composite 6PM CST July 25, 1986

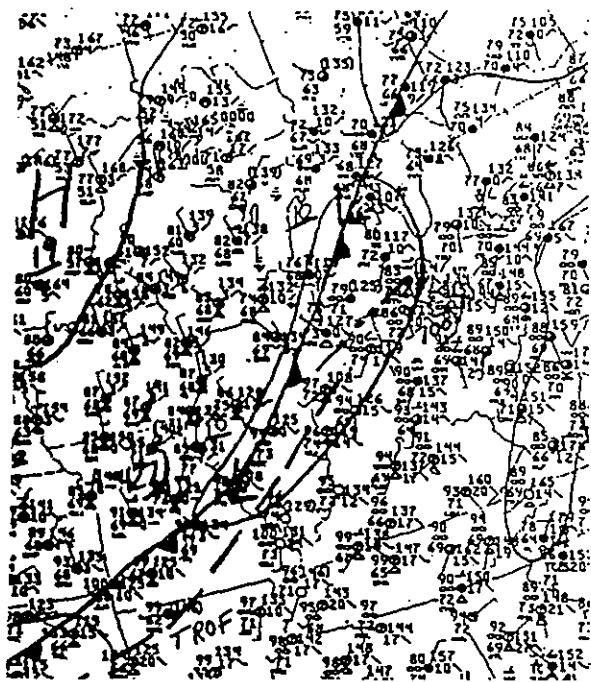


500MB 6PM CST July 25, 1986

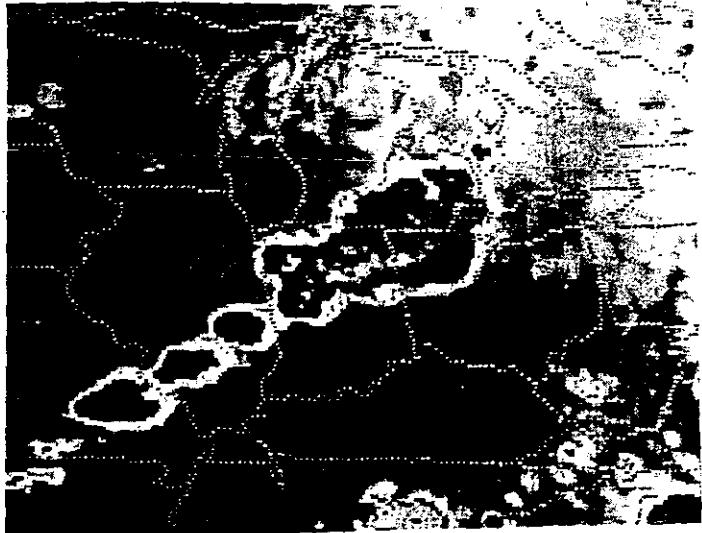
1 1703 CST F-1 TORNADO RANKIN MI 1 INJURED

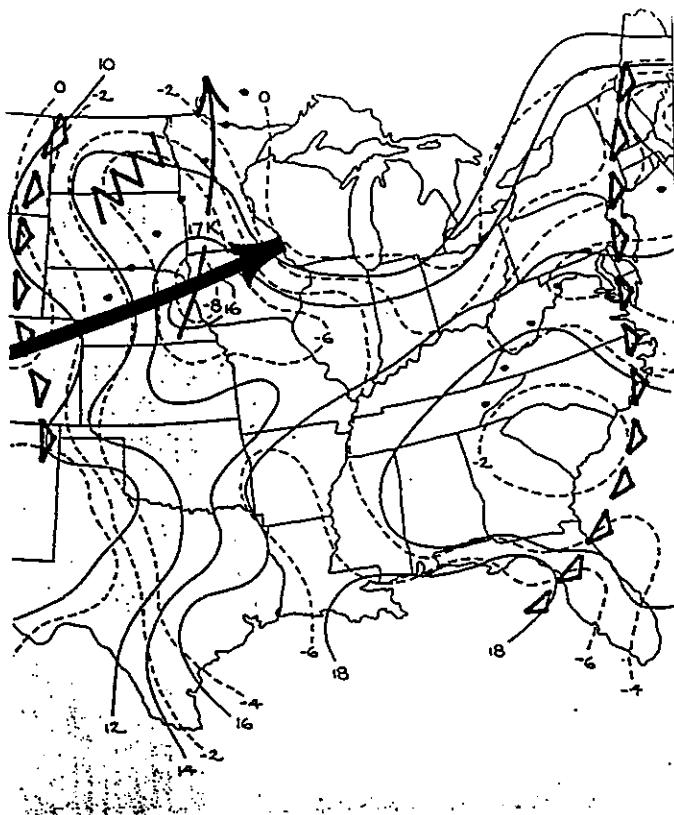


25JUL86 1450-1939 CST 38 REPORTS 2 TORNADOS

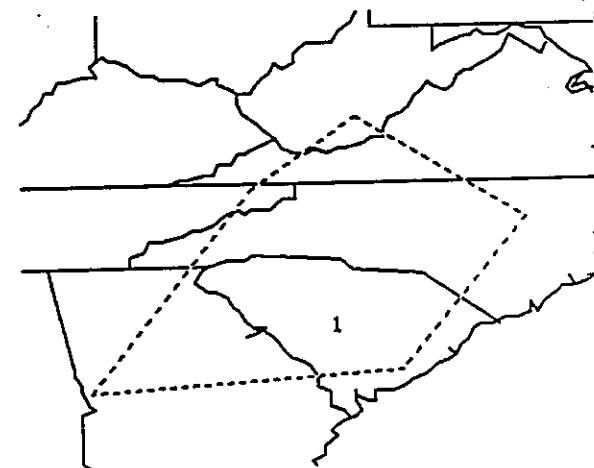


Surface 3PM CST July 25, 1986



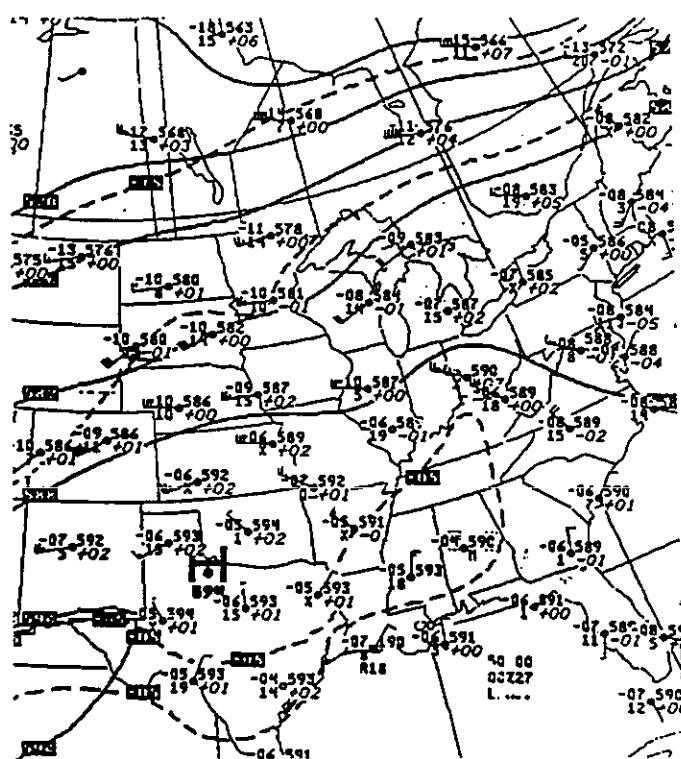


1 1230 CST F-1 TORNADO JOHN'S ISLAND

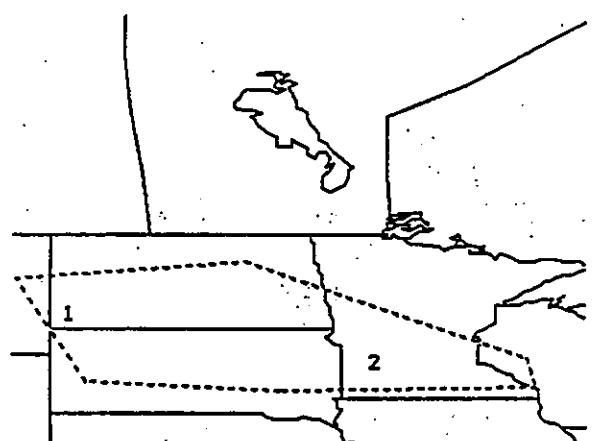


26JUL86 1200-1735 CST 19 REPORTS 1 TORNADO

Composite 6PM CST July 26, 1986

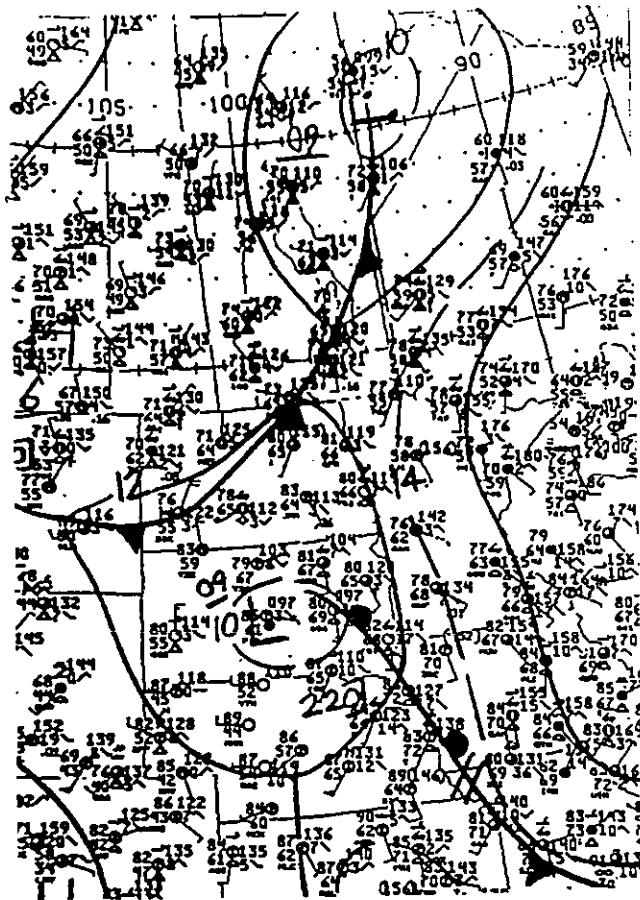


1 1645 CST 81 MPH WIND GUST BOWMAN ND
2 1713 CST F-1 TORNADO 6 E MONTEVIDEO MN

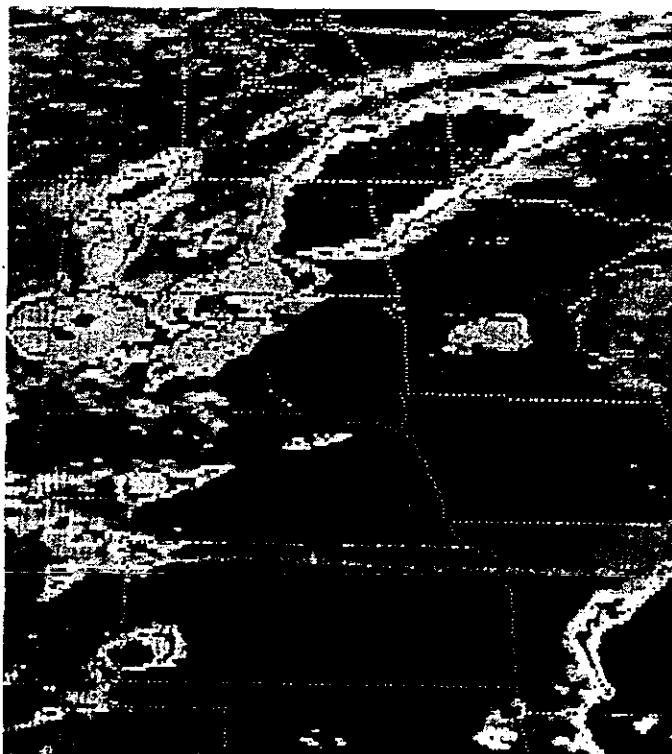


26JUL86-27JUL86 1315-0445 CST 21 REPORTS 1 TORNADO

500MB 6PM CST July 26, 1986



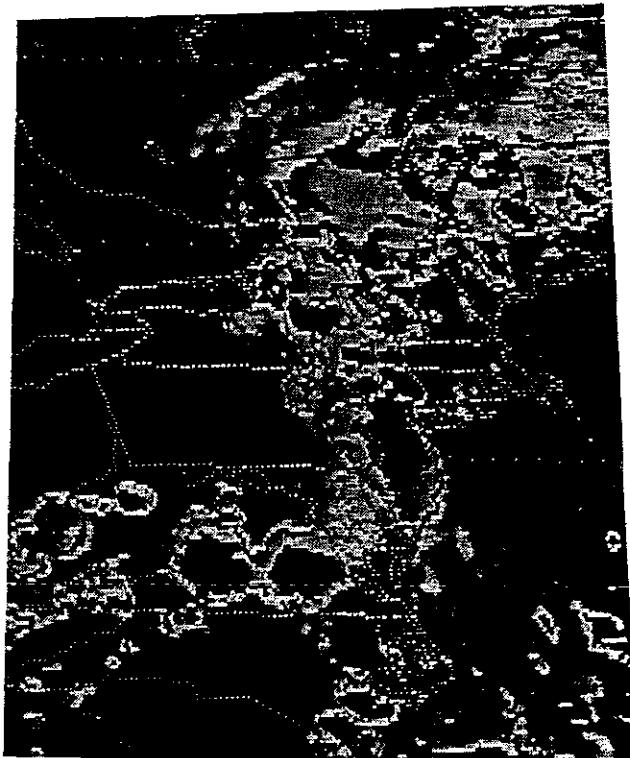
Surface 12 Noon CST July 26, 1986



GOES 5PM CST July 26, 1986

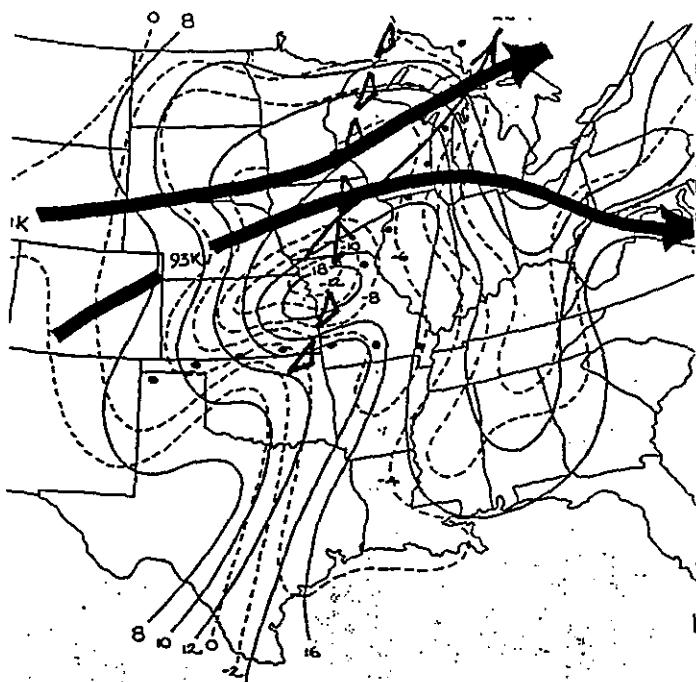


Surface 12 Noon CST July 26 1986

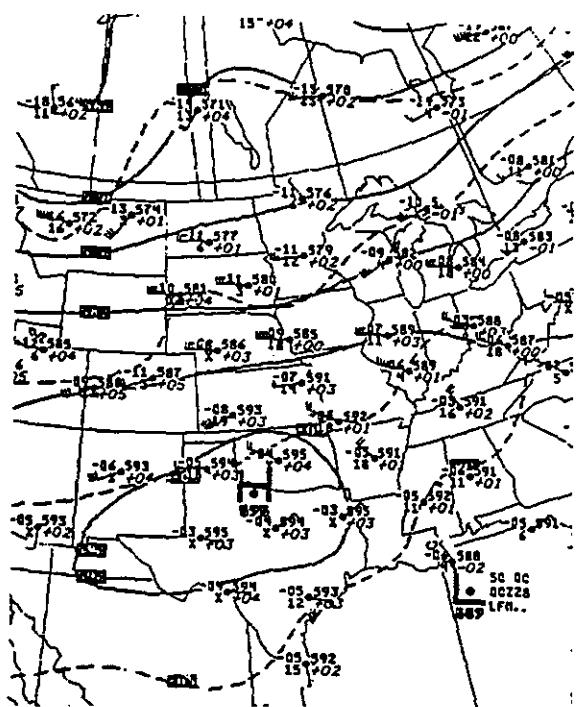


GOES 1:30PM CST July 26. 1986

No. 14 July 27 1986



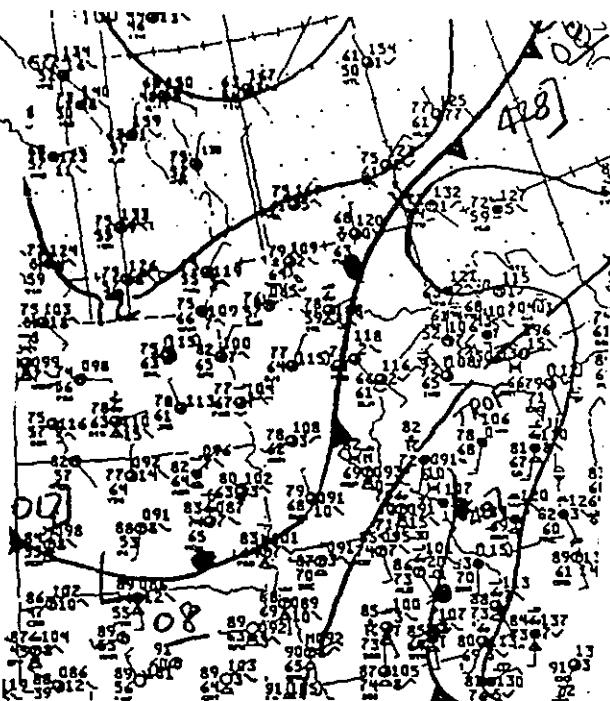
Composite 6PM CST July 27, 1986



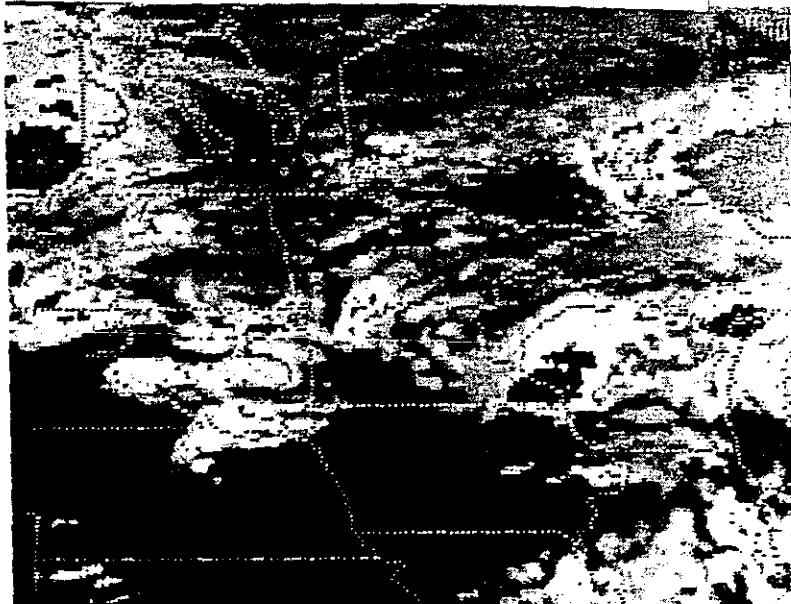
500MB 6PM CST July 27, 1986



27JUL86 1200-2339 CST 29 REPORTS 5 TORNADOES

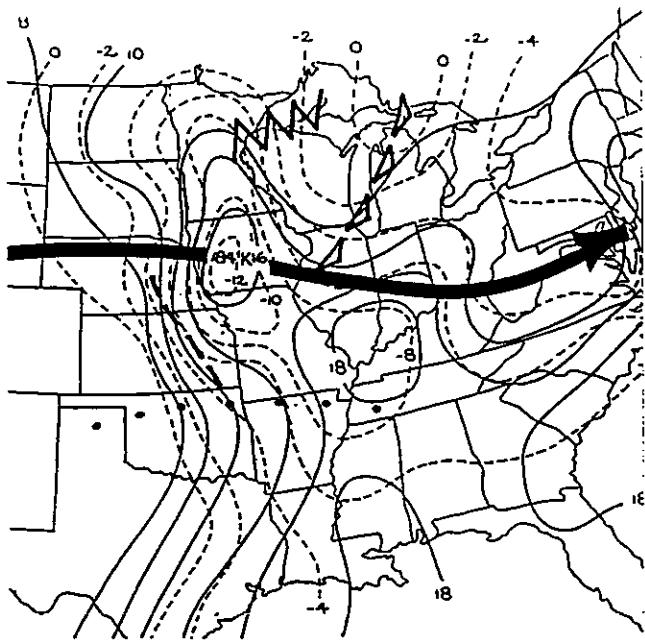


Surface 3PM CST July 27, 1986

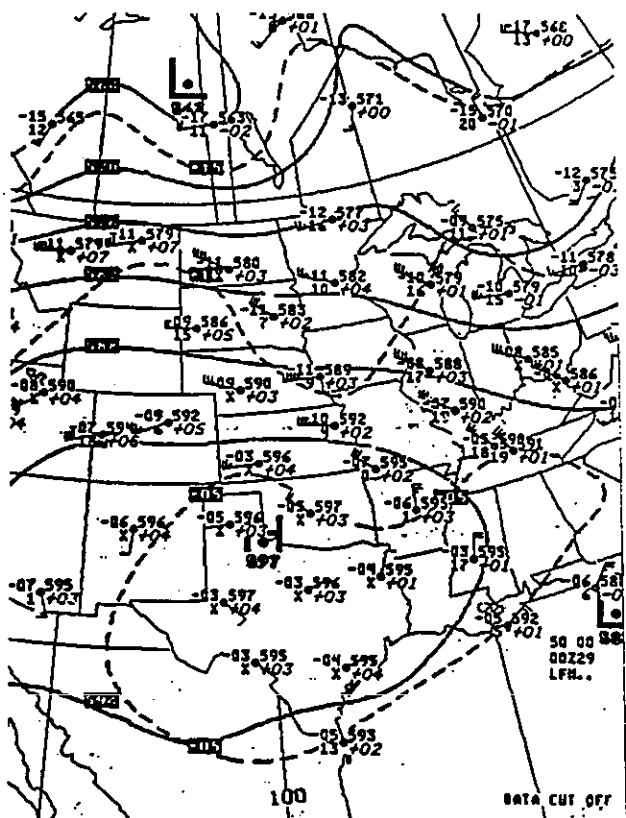


GOES 5PM CST July 27, 1986

No. 15 July 28-29 1986

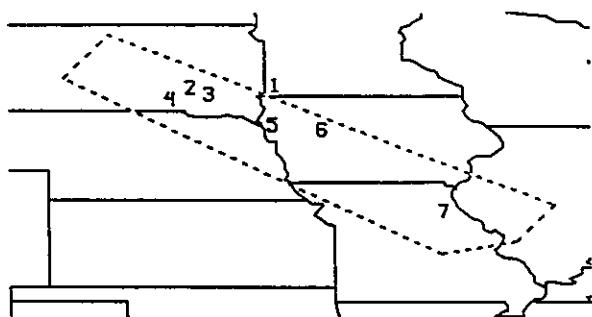


Composite 6PM CST July 28, 1986

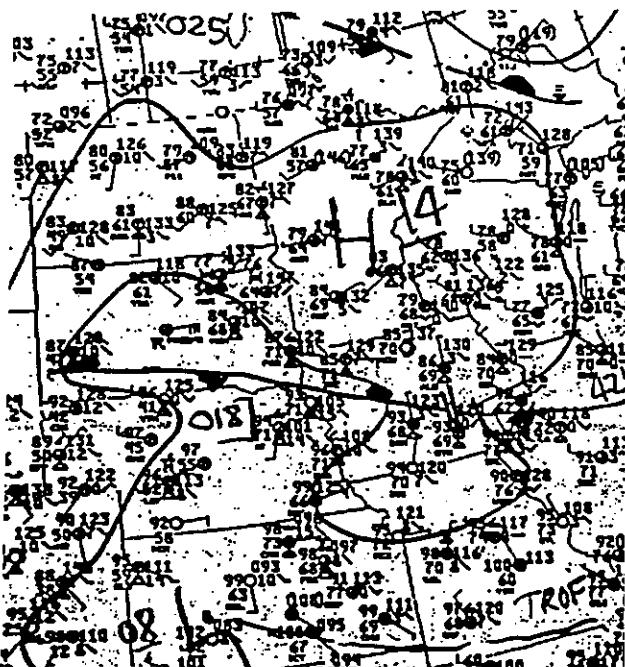


500MB 6PM CST July 28, 1986

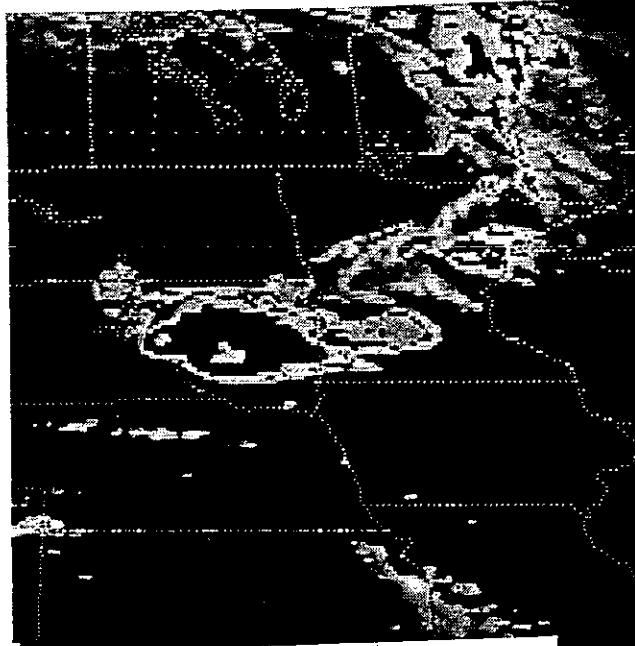
- | | | | | |
|---|---------------|------------------|---------------------------------|---------------------|
| 1 | 1600 CST | 3.00 INCH HAIL | LAKE BENTON MN | *3 MILLION DAMAGE |
| 2 | 1613 CST | F-2 TORNADO | KIMBALL SD | |
| 3 | 1630 CST | F-2 TORNADO | WHITE LAKE SD | |
| 4 | 1630 CST | F-2 TORNADO | CORSICA SD | |
| 5 | 1730-1810 CST | F-3 TORNADO | 1 KILLED 8 INJURED 68 MILE PATH | |
| 6 | 1848 CST | F-4 TORNADO | 3 6 SIOUX CITY IA | *23-30 MILLION DMG |
| 7 | 1847 CST | F-2 TORNADO | POMEROY IA | |
| | 0043 CST | 80 MPH WIND GUST | HANNIBAL MO | *0.3 MILLION DAMAGE |



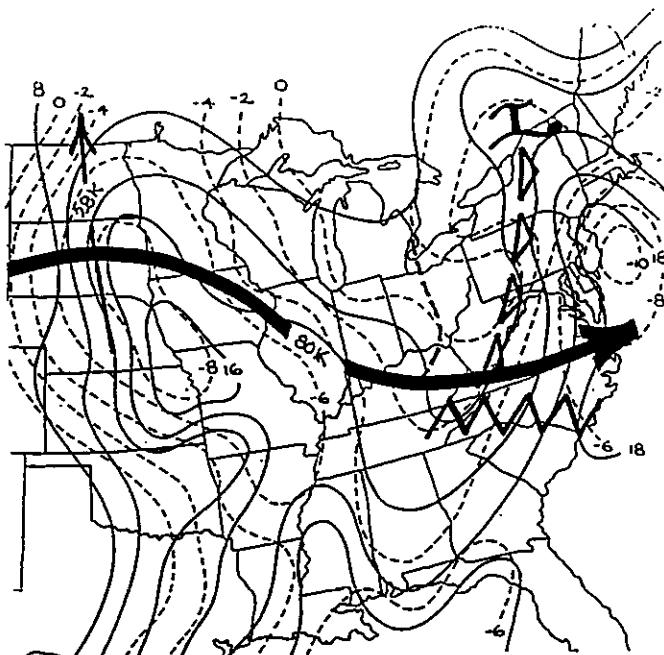
28JUL86-29JUL86 1430-0300 CST 122 REPORTS 12 TORNADOES



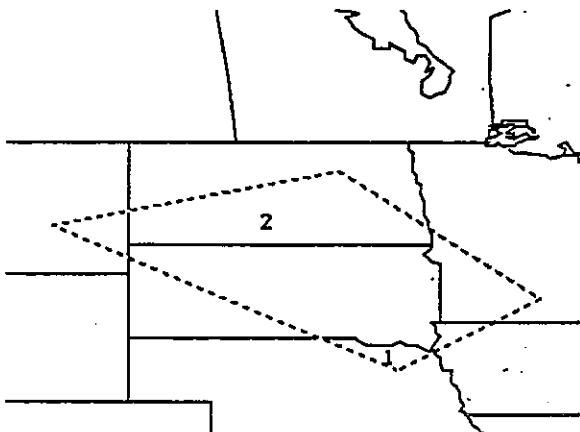
Surface 3PM CST July 28, 1986



GOES 4PM CST July 28, 1986

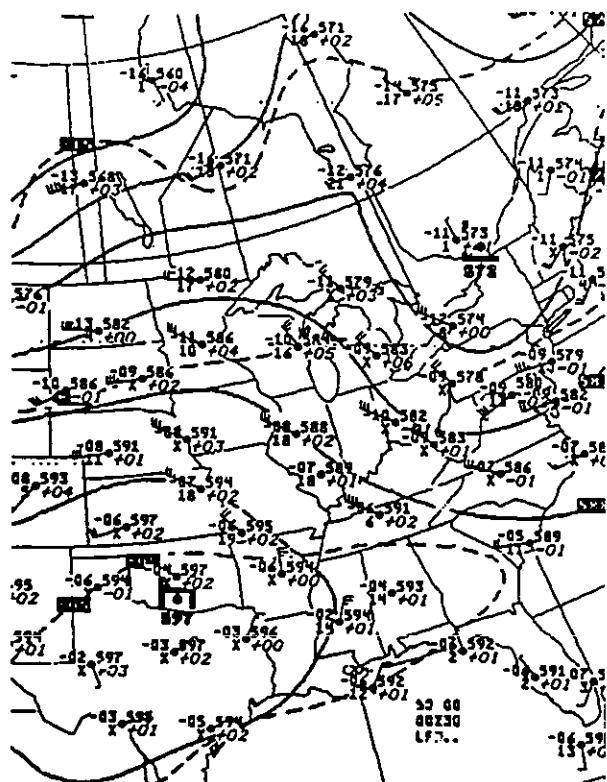


1 1837 CST 3.80 INCH HAIL 8 NNE HELISH NE
2 2010 CST 4.00 INCH HAIL BISMARCK ND

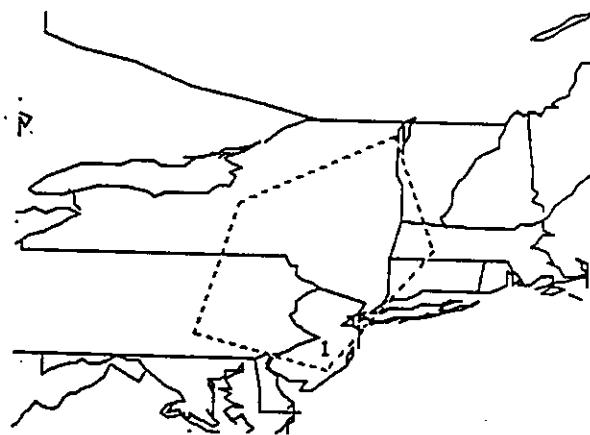


29JUL86-30JUL86 1635-0500 CST 39 REPORTS 4 TORNADOES

Composite 6PM CST July 29, 1986

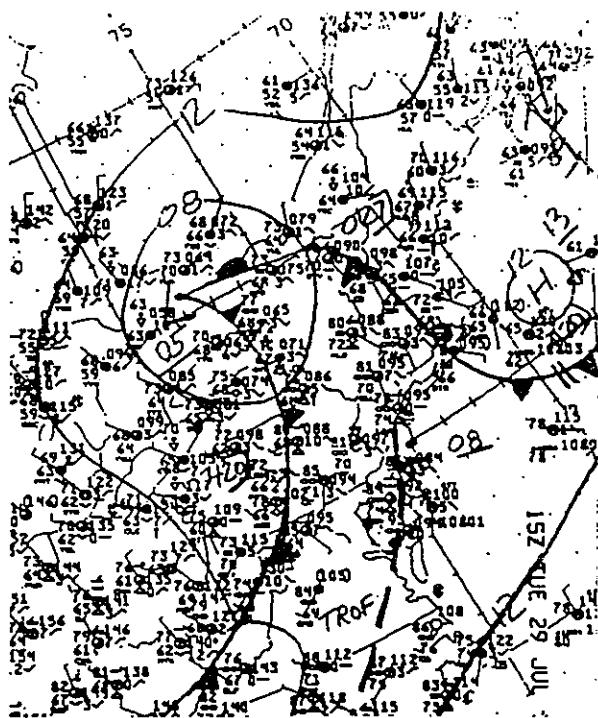


1323 CST 74 MPH WIND GUST BRANT BENCH NJ

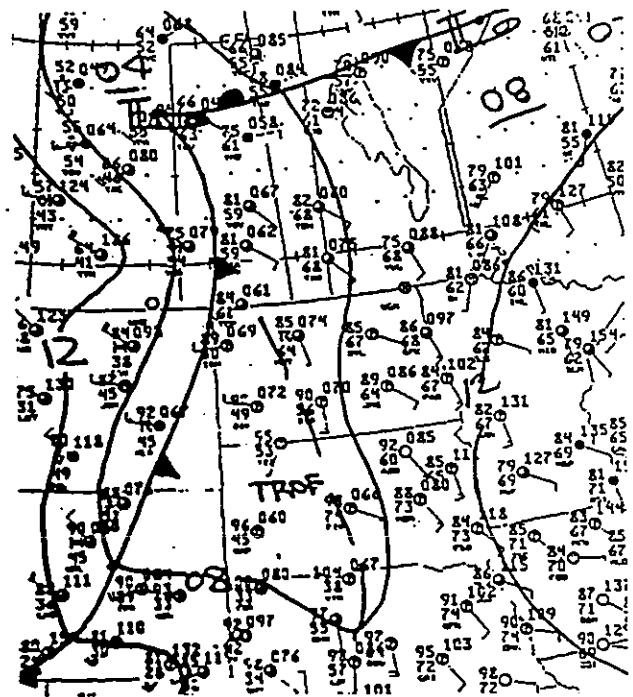


29JUL86 0935-1611 CST 41 REPORTS

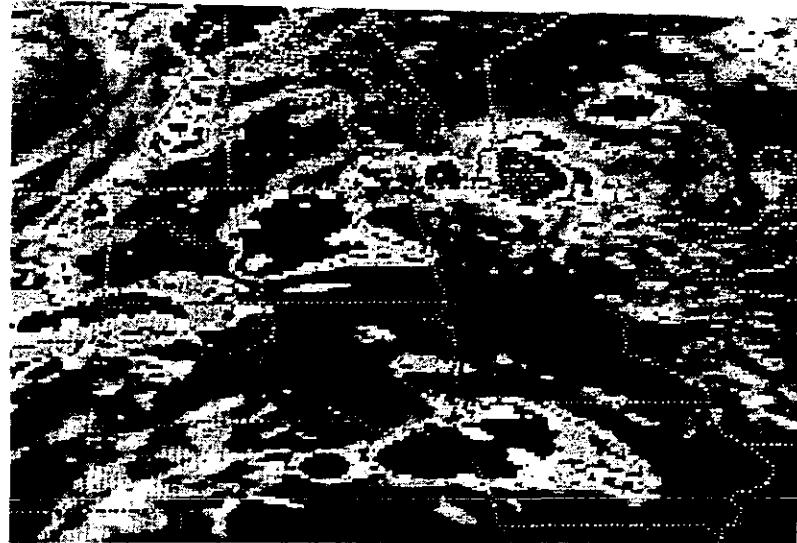
500MB 6PM CST July 29, 1986



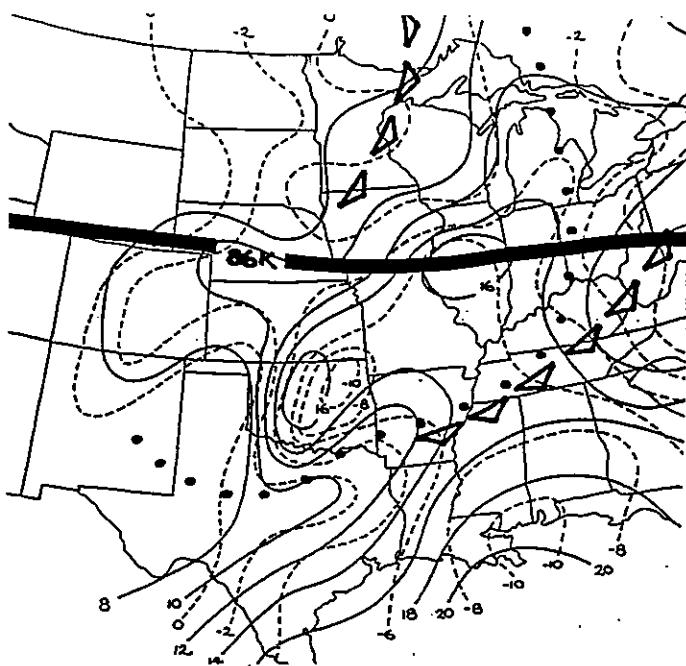
Surface 9AM CST July 29, 1986



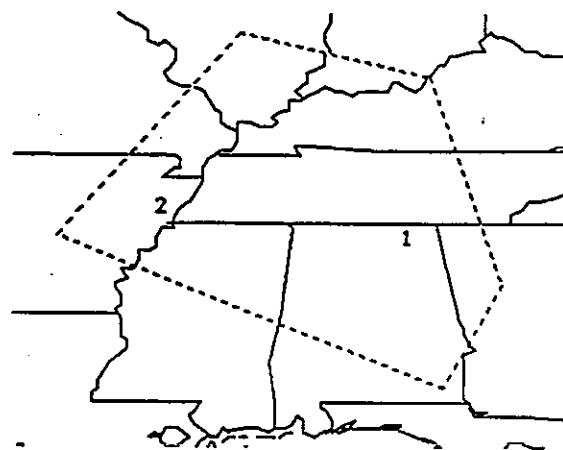
Surface 6PM CST July 29, 1986



GOES 6:30 PM CST July 29, 1986

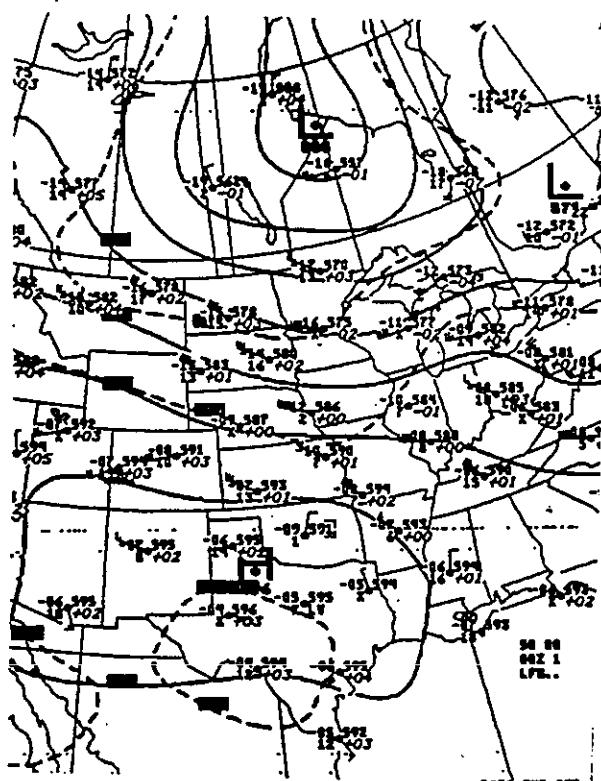


1 1230 CST 2.73 INCH HAIL UNION GROVE AL
2 1740 CST 70 MPH WIND GUST MEMPHIS TN

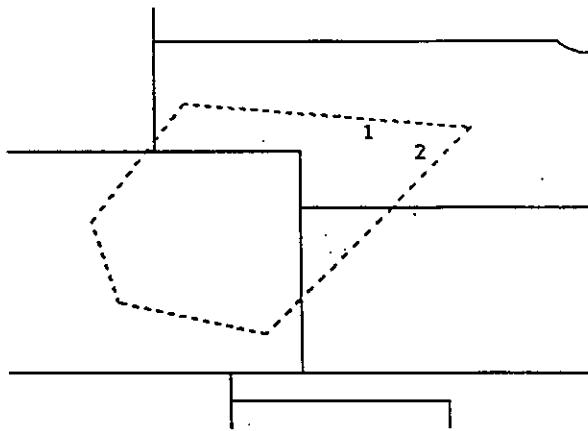


31JUL86 0601-2200 CST 41 REPORTS

Composite 6PM CST July 31, 1986

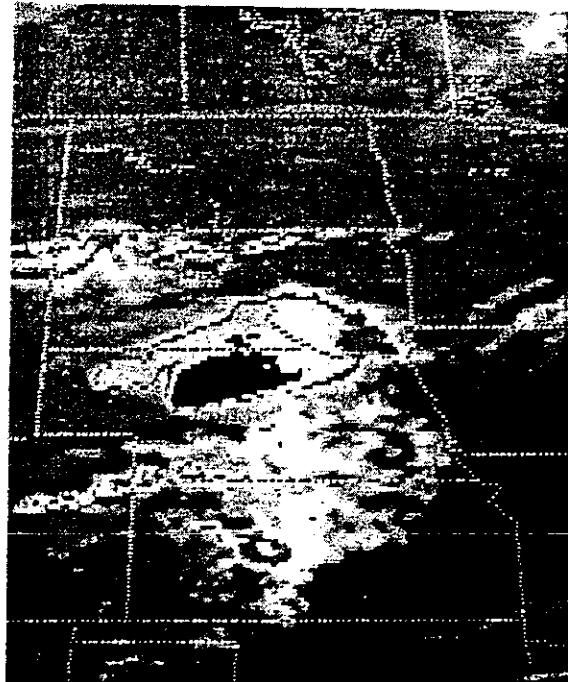
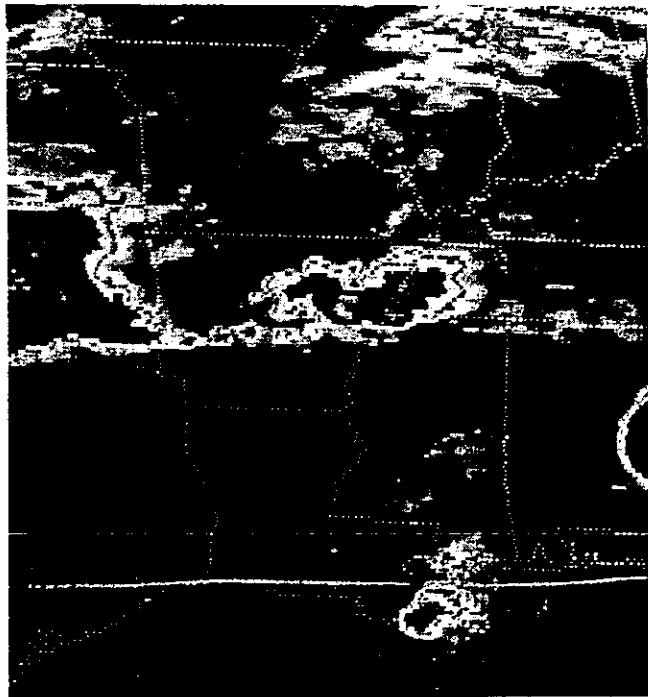
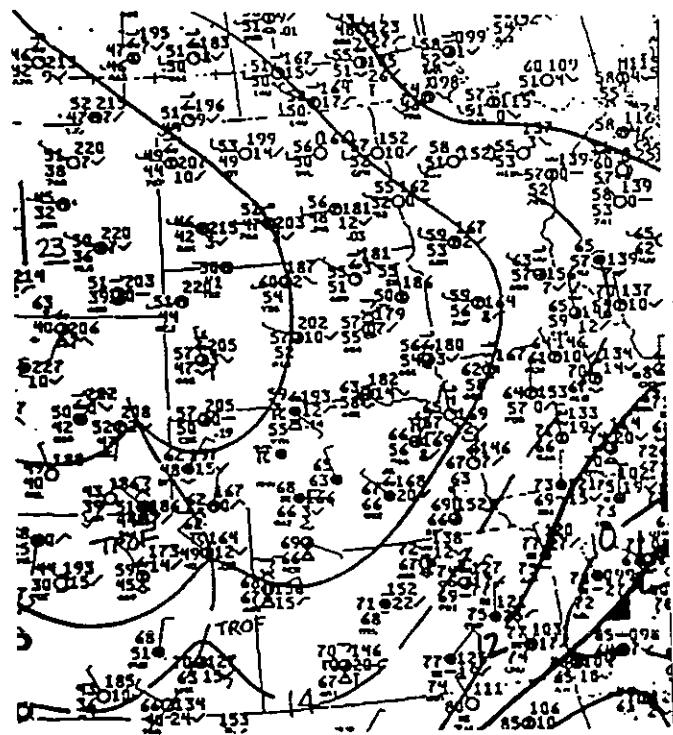
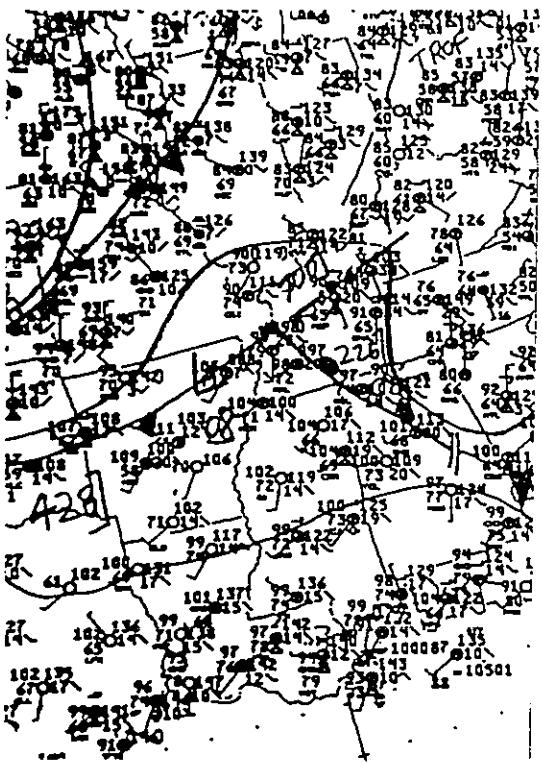


L 0600 CST 4.00 INCH HAIL TRYON NC *0.3 MILLION DAMAGE
2 0813 CST 100 MPH WIND GUST 8 M COZAD NE *0.3 MIL DMG

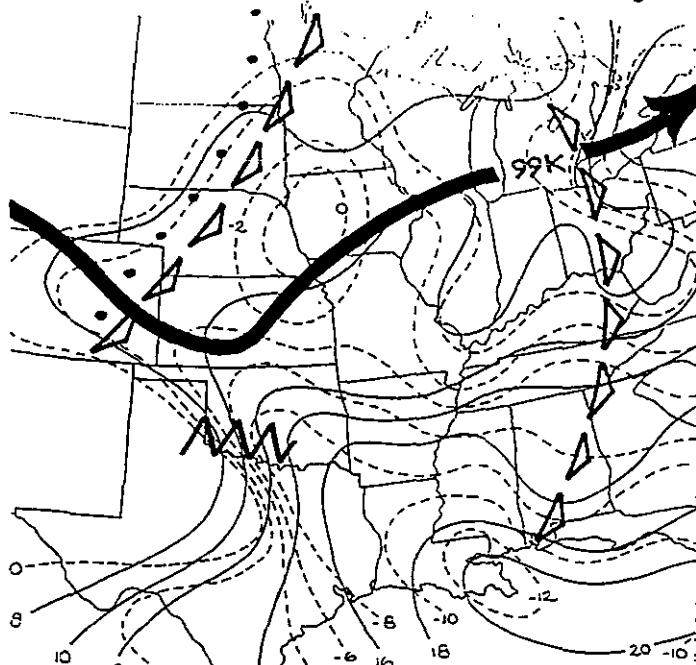


31JUL86 0600-2150 CST 11 REPORTS 2 TORNADOES

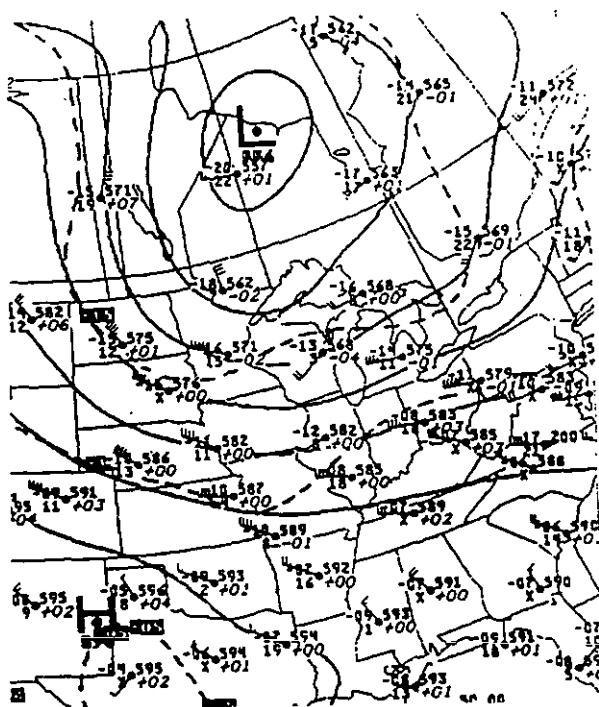
500MB 6PM CST July 31, 1986



No. 18 August 1-2 1986



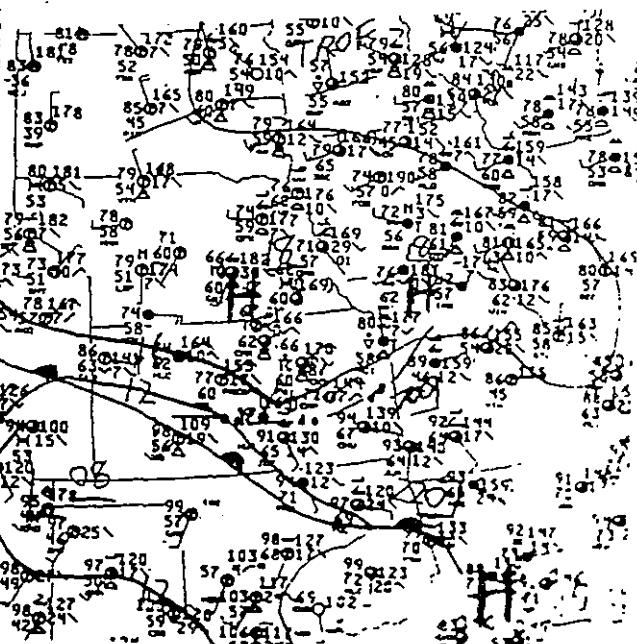
Composite 6PM CST August 1, 1986



500MB 6PM CST August 1, 1986

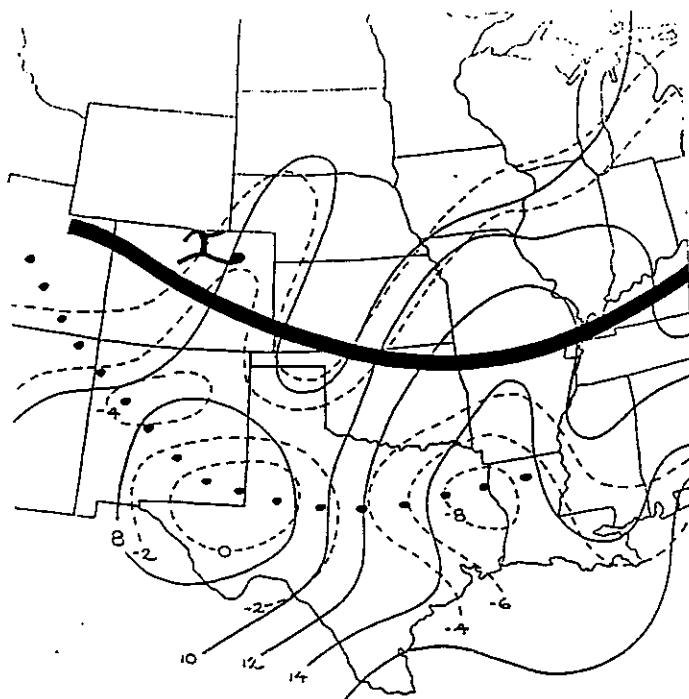
NO	TIME	EVENT	ST	LOCATION	REPORTS
1	1600	3.30 INCH HAIL	KS	DUNLENGTON	\$37 MILLION DAMAGE
2	1613	100 MPH WINDS	KS	LEROY	18 INJURIES
3	1630	100 MPH WINDS	KS	PEORIA	
4	1633	1.00 INCH HAIL	KS	JOLIA	\$23 MILLION DAMAGE

01AUG86-02AUG86 1100-0330 CST 120 REPORTS 1 TORNADO

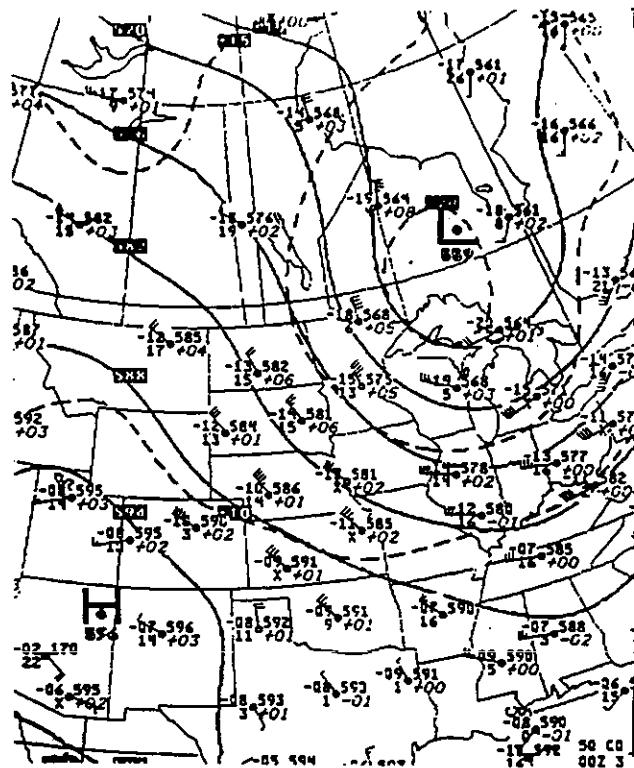


Surface 3PM CST August 1, 1986



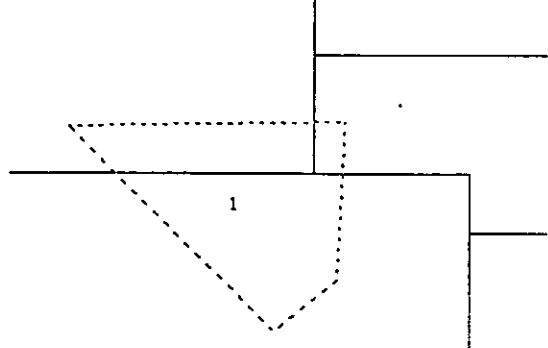


Composite 6PM CST August 2, 1986

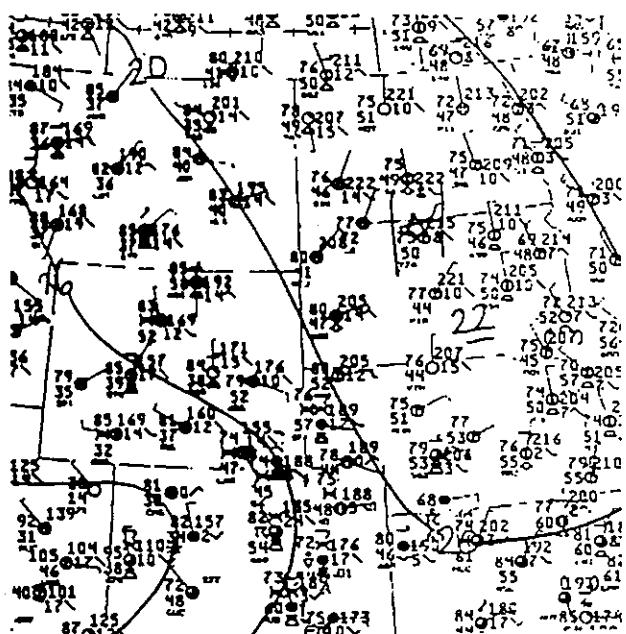


500MB 6PM CST August 2, 1986

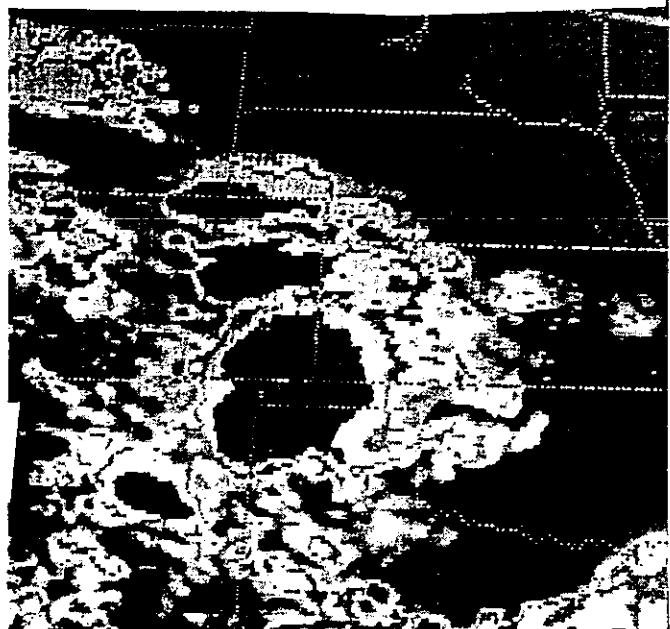
NO. 19 EVENT 61 LOCATION
1. IOWA 2.75 INCH HAIL CO FORT COLLINS.
TOTAL HAIL DAMAGE 70 MILLION DOLLARS
SIX INJURIES IN LONGMONT CO

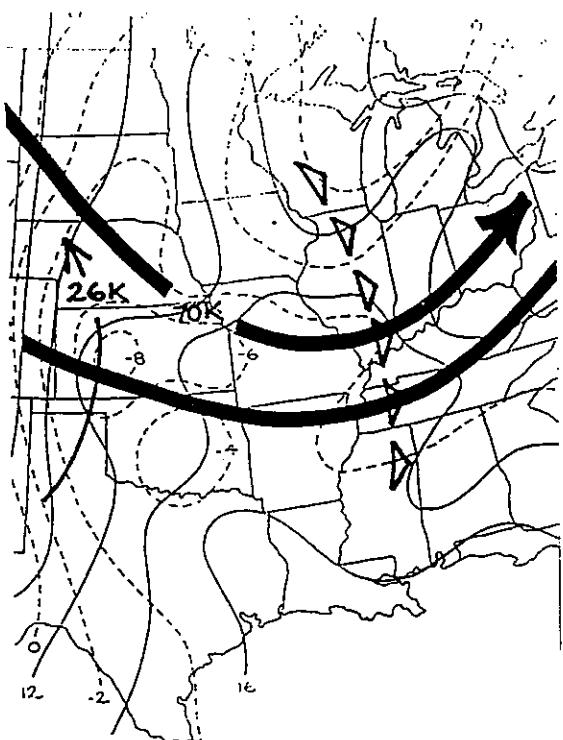


02AUG86 1416-2130 CST 41 REPORTS 1 TORNADO

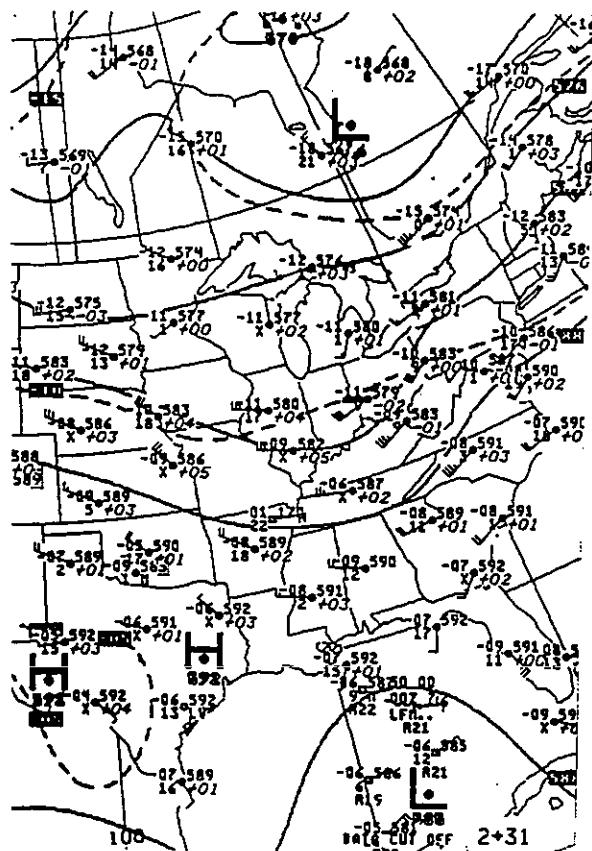


Surface 6PM CST August 2, 1986



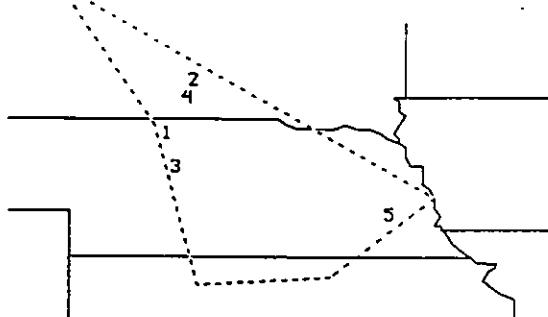


Composite 6PM CST August 6, 1986

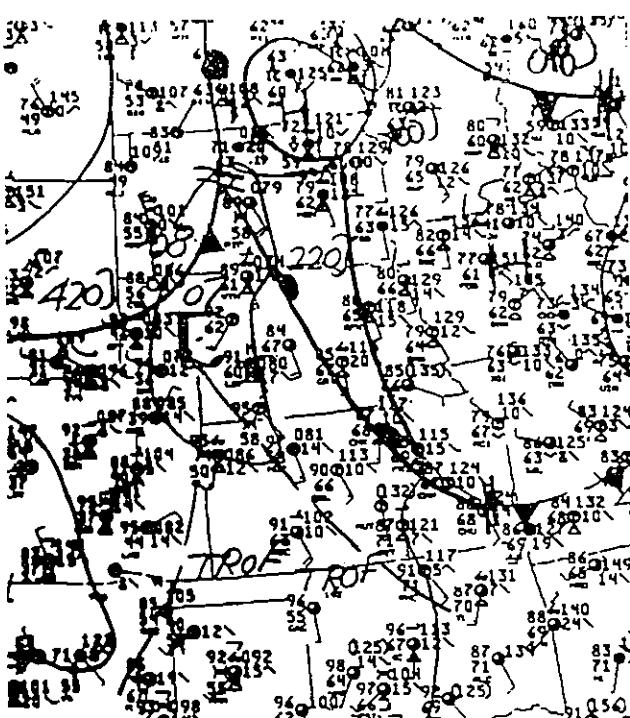


500MB 6PM CST August 6, 1986

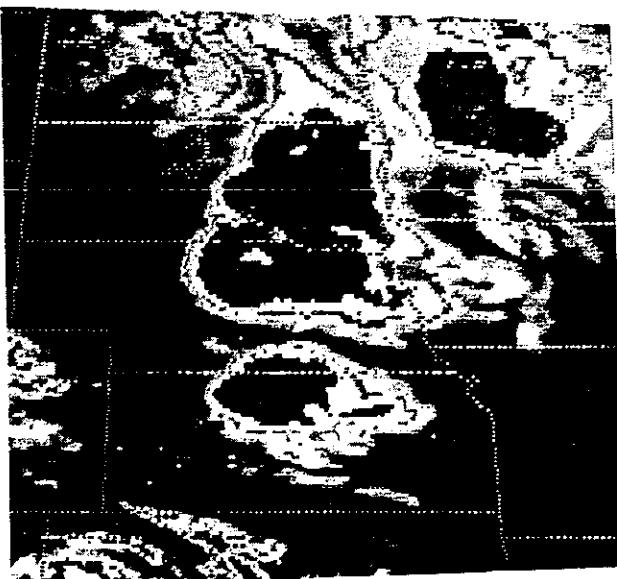
NU	TIME	EVENT	ST	LOCATION
1	1642	4.00 INCH HAIL	NE	VALENTINE
2	1830	4.30 INCH HAIL	SD	20 S KENNEBEC
3	1800	F-2 TORNADO	NE	CLOMERE
4	1850	80 MPH WINDS	SD	WINNER
5	2216	70 MPH WINDS	NE	LINCOLN



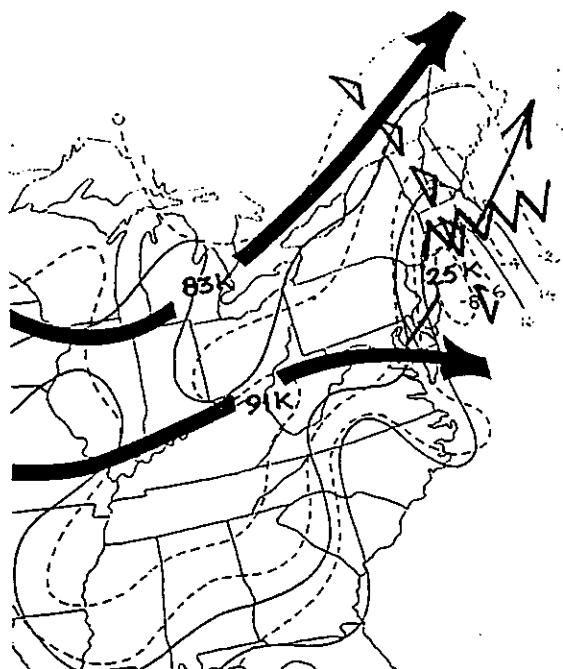
06AUG86-07AUG86 1610-0240 CST 45 REPORTS 3 TORNADOES



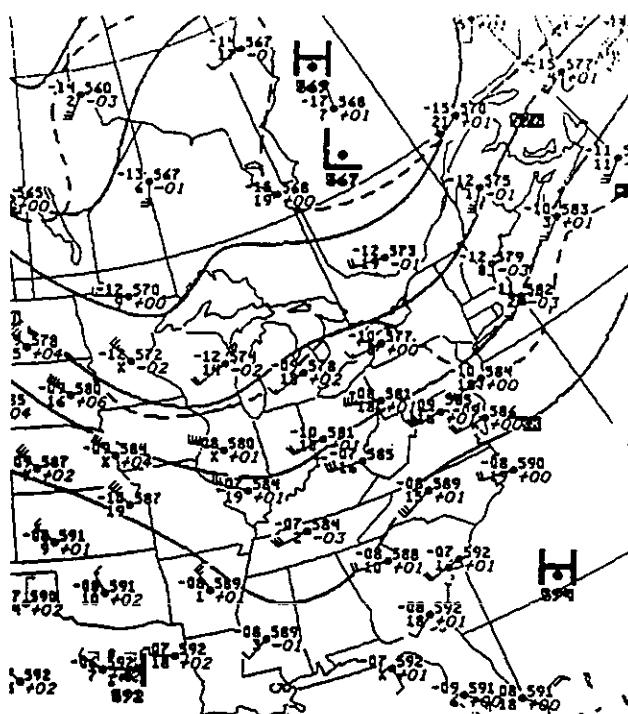
Surface 3PM CST August 6, 1986



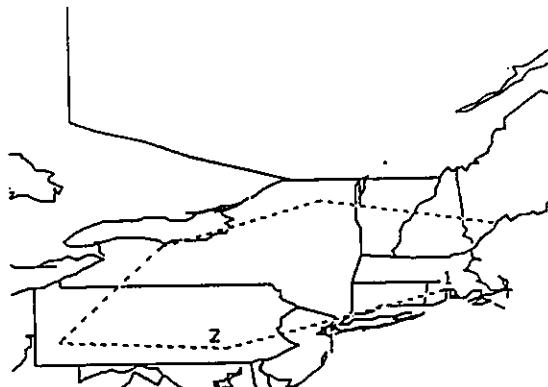
NO	TIME	EVENT	LT	LOCATION
1	1013	1-7 TORNADO	HI	CHAMONIX
2	1335	2-30 INCH HAIL	PA	MERSEY



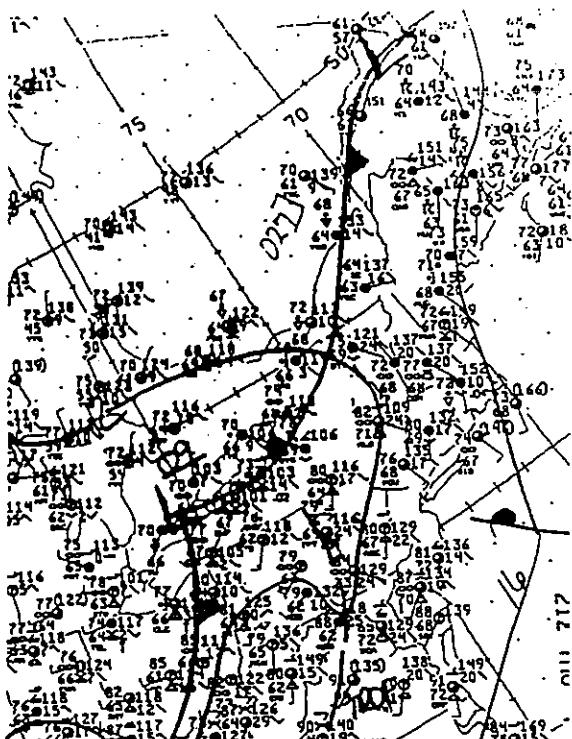
Composite 6PM CST August 7, 1986



500MB 6PM CST August 7, 1986



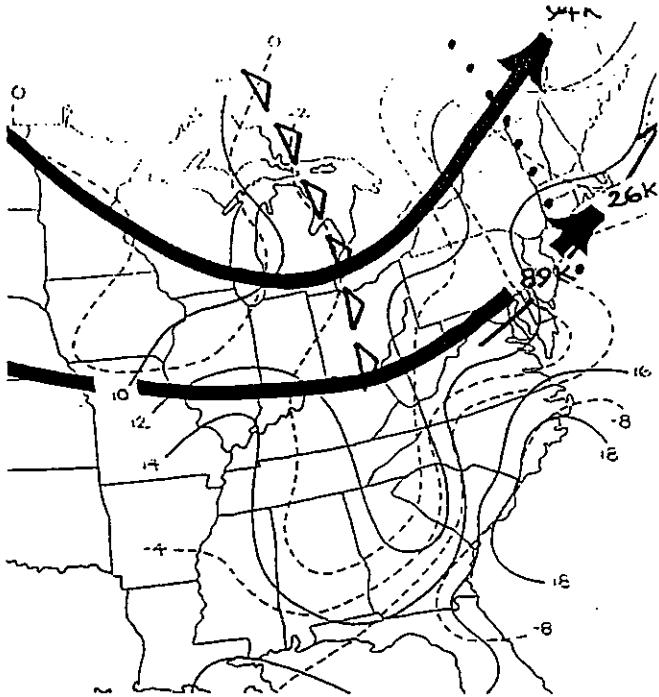
07AUG86 1235-1845 CST 47 REPORTS 7 TORNADOES



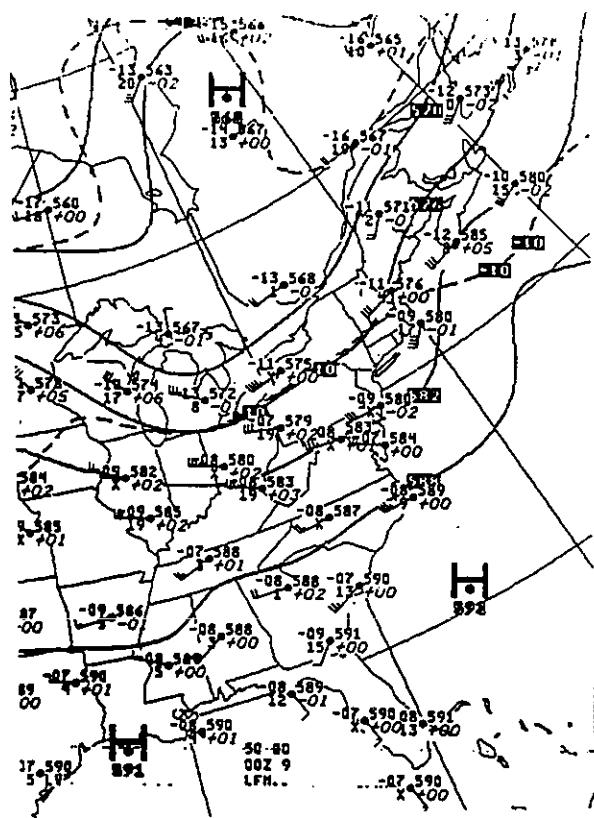
Surface 3PM CST August 7, 1986



No. 22 August 8 1986

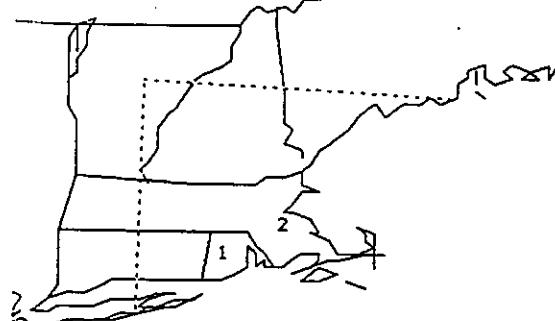


Composite 6PM CST August 8, 1986

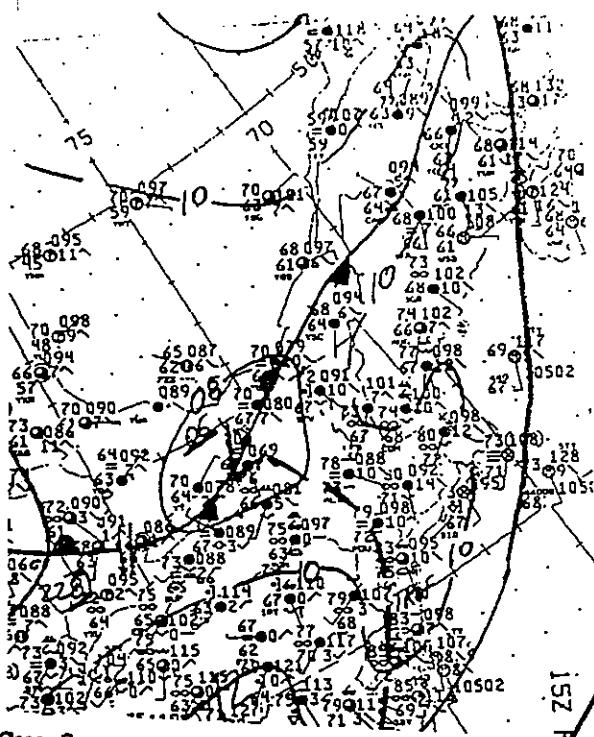


500MB 6PM CST August 8, 1986

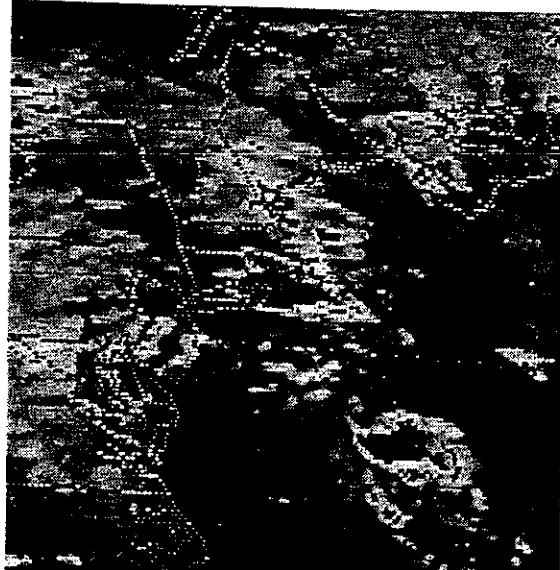
TEHL EVENT	ST LOCATION
19813 F-1 TORNADO 1000 65 MPH WINDS	RI BURRILLVILLE MA BOSTON 10.3 MILLION DAMAGE



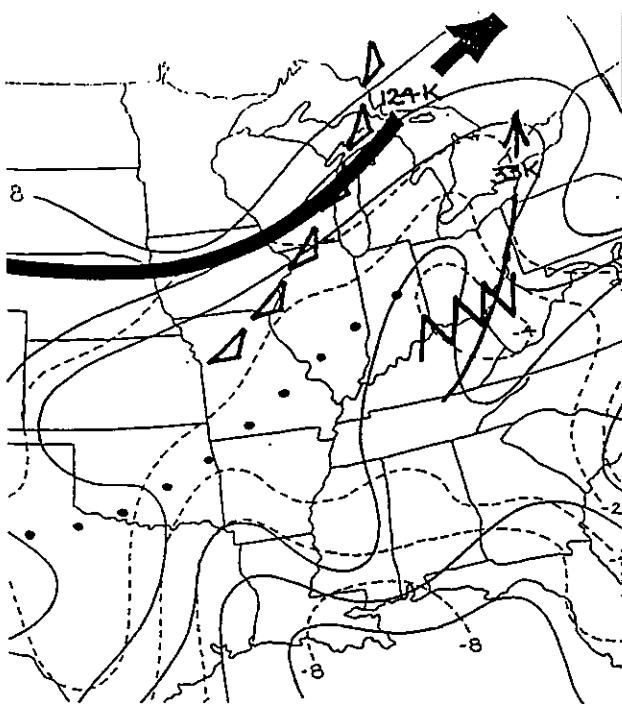
08AUG86 0915-1540 CST 9 REPORTS 1 TORNADO



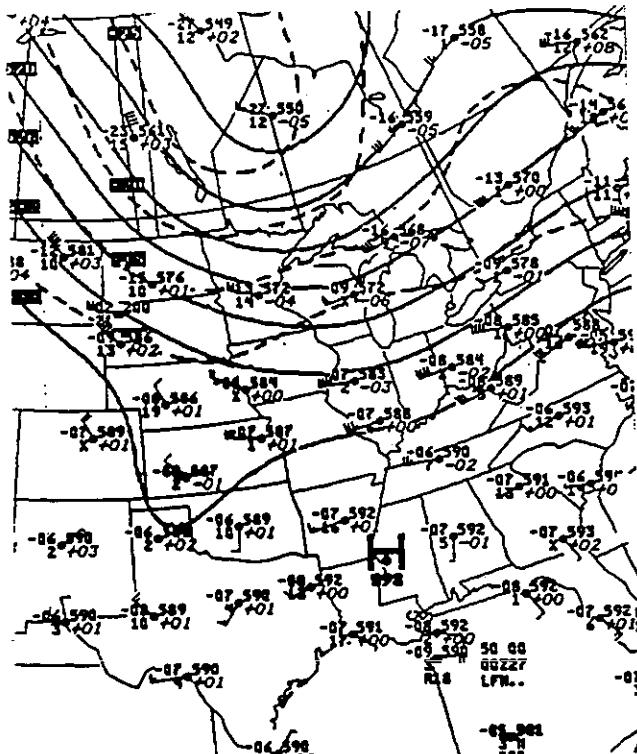
Surface 9AM CST August 8, 1986



36 GOES 9AM CST August 8, 1986

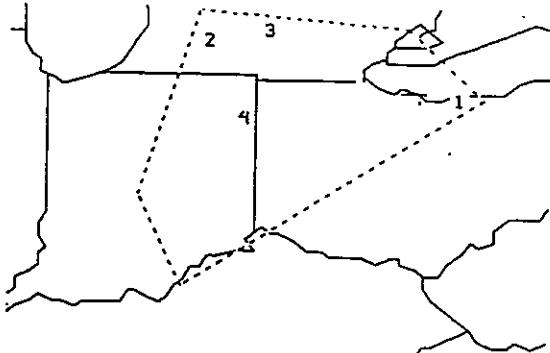


Composite 6PM CST August 26, 1986

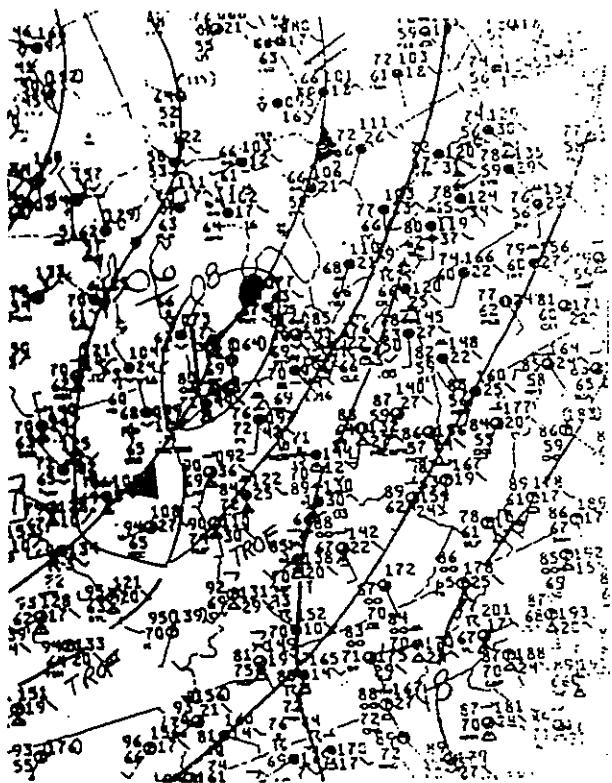


500MB 6PM CST August 26, 1986

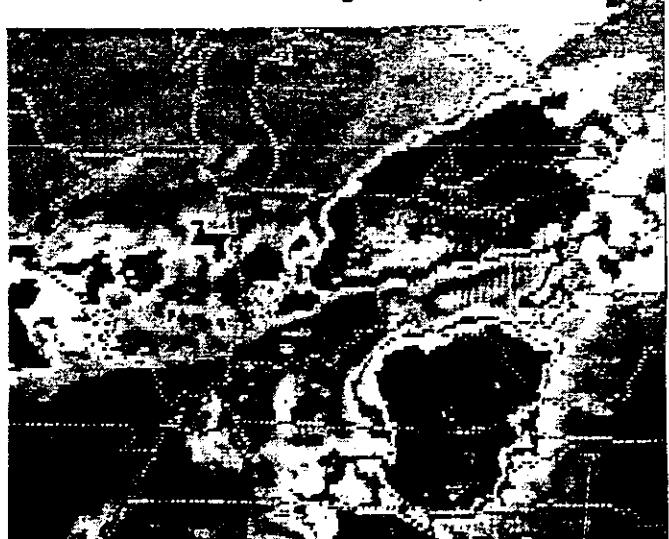
NO	TIME	EVENT	GT	LOCATION	INJURIES
1	1410	F-2 TORNADO	OH	LORAIN	2 INJURIES
2	1540	F-2 TORNADO	MI	DELTON	56
3	1630	F-2 TORNADO	MI	DIMONDINE	2 INJURIES
4	1806	F-2 TORNADO	IN	DECATUR	\$4 MILLION DAMAGE



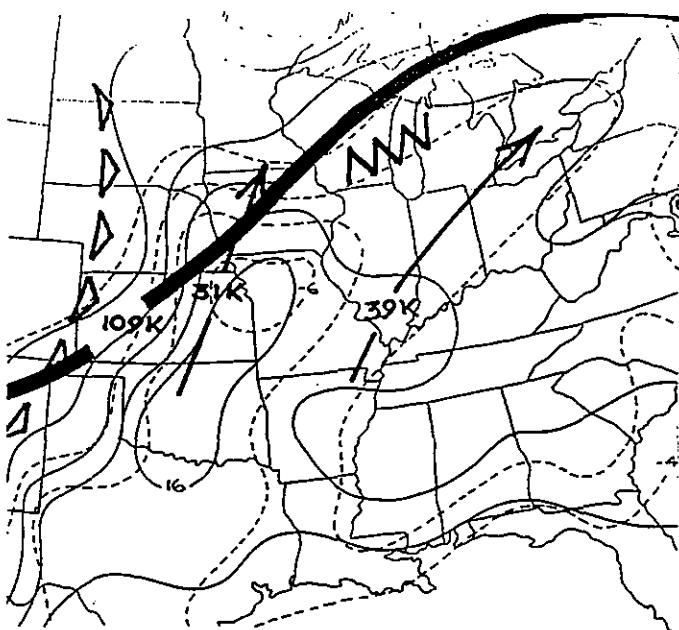
26AUG86 1127-1855 CST 38 REPORTS 6 TORNADOES



Surface 3PM CST August 26, 1986

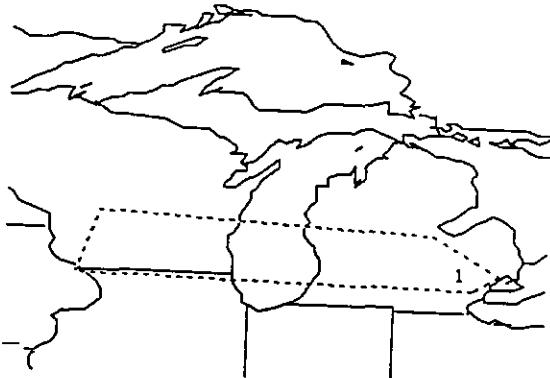


NO. 24 September 10 1986

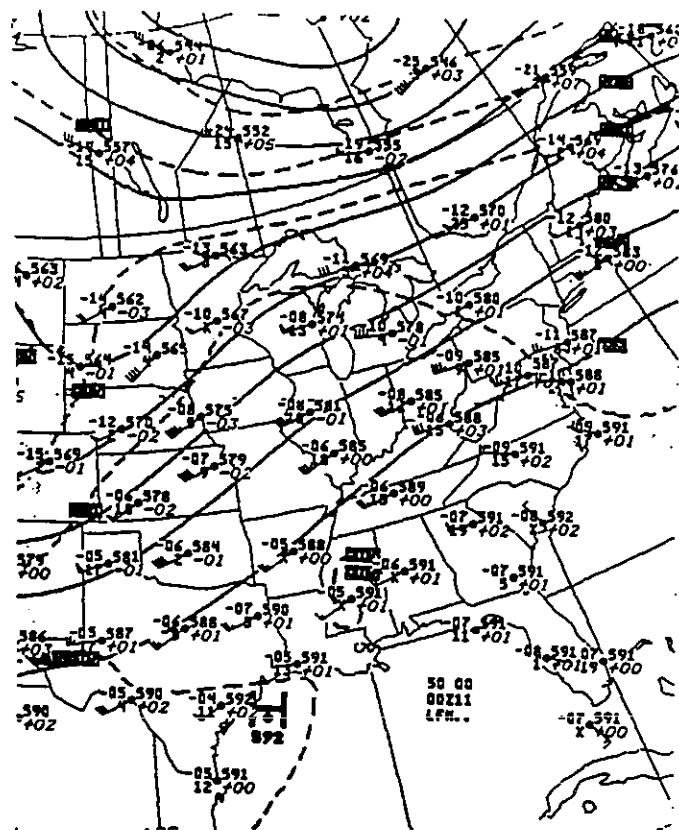


Composite 6PM CST September 10, 1986

NO TIME EVENT ST LOCATION
1 1730 F-2 TORNADO MI COMMERCE

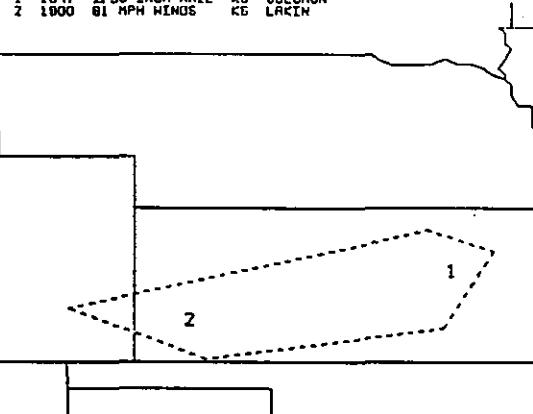


SEP86 1430-1945 CST 14 REPORTS 2 TORNADOS

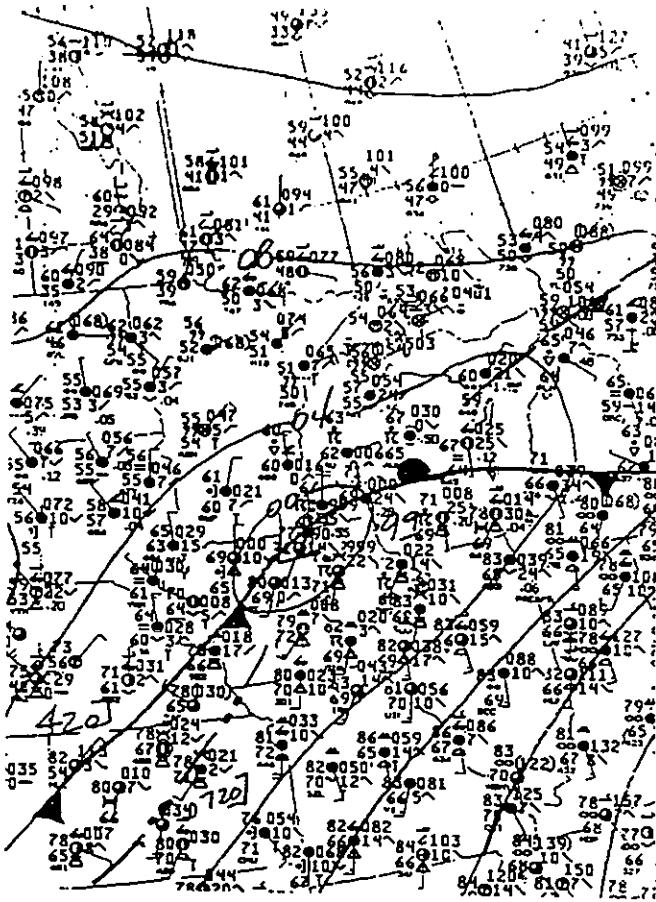


500MB 6PM CST September 10, 1986

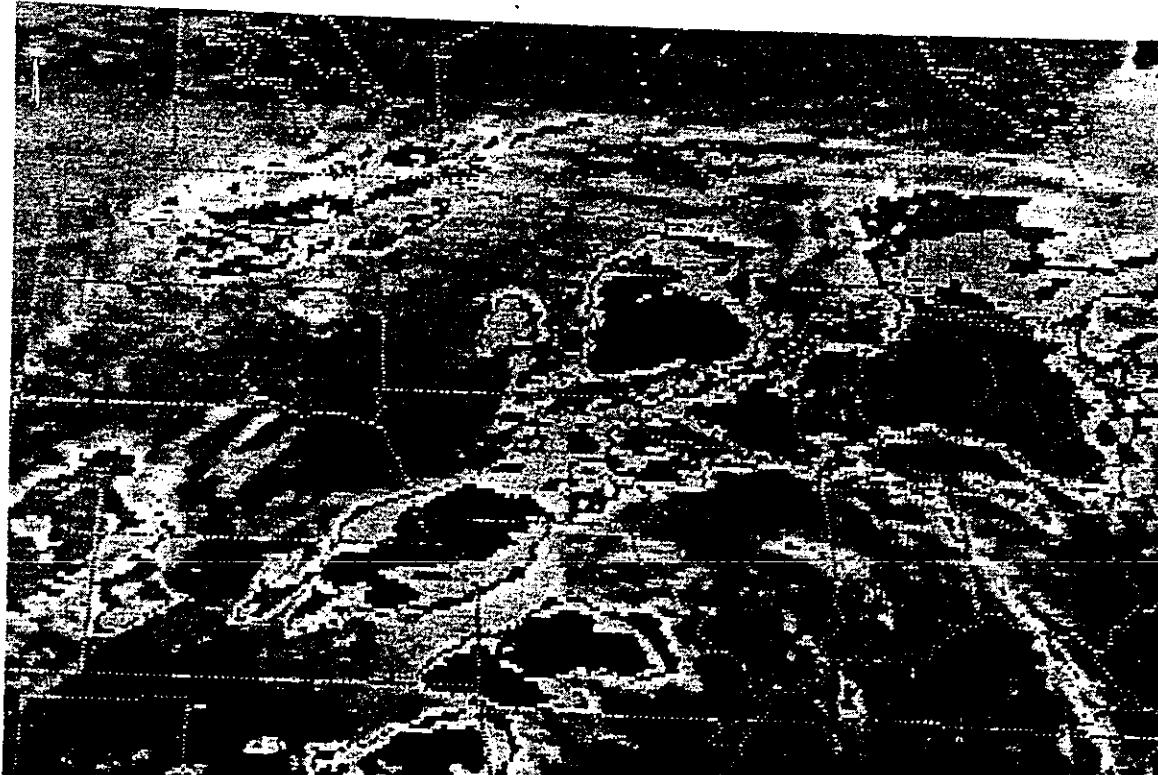
NO TIME EVENT ST LOCATION
1 1847 2.50 INCH HAIL KS SOLOMON
2 1800 81 MPH WINDS KS LAKIN



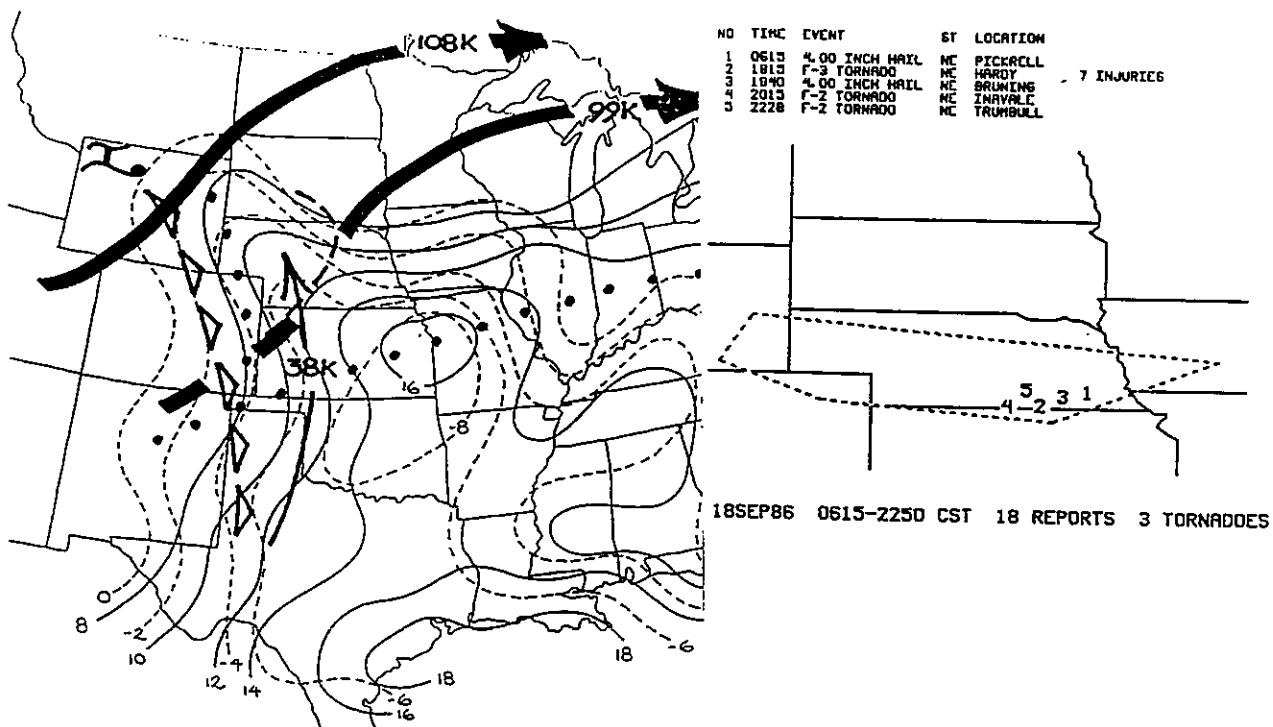
10SEP86 1536-2300 CST 31 REPORTS 1 TORNADO



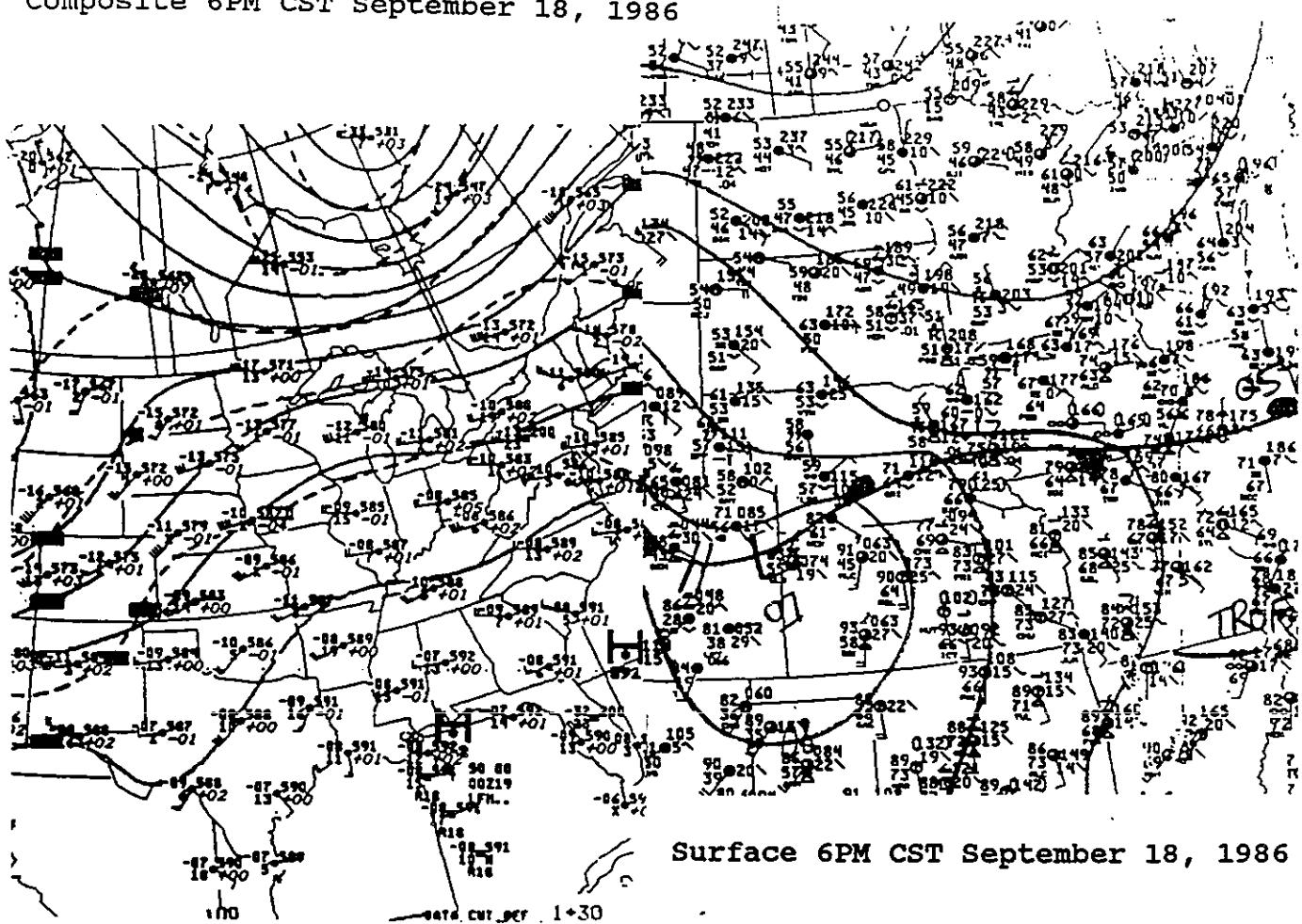
Surface 6PM CST September 10, 1986



GOES 6:30 PM CST September 10, 1986



Composite 6PM CST September 18, 1986

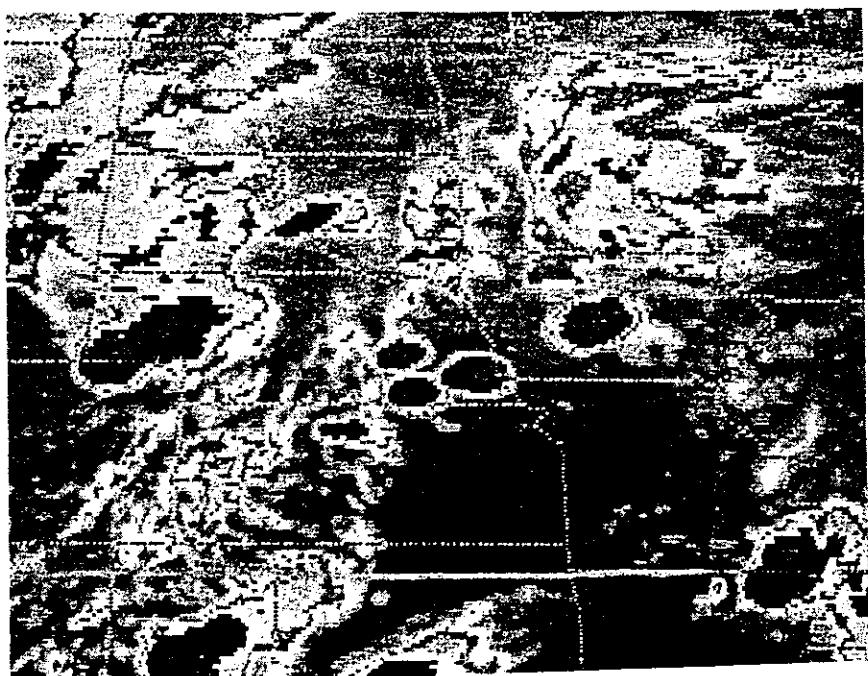


Surface 6PM CST September 18, 1986

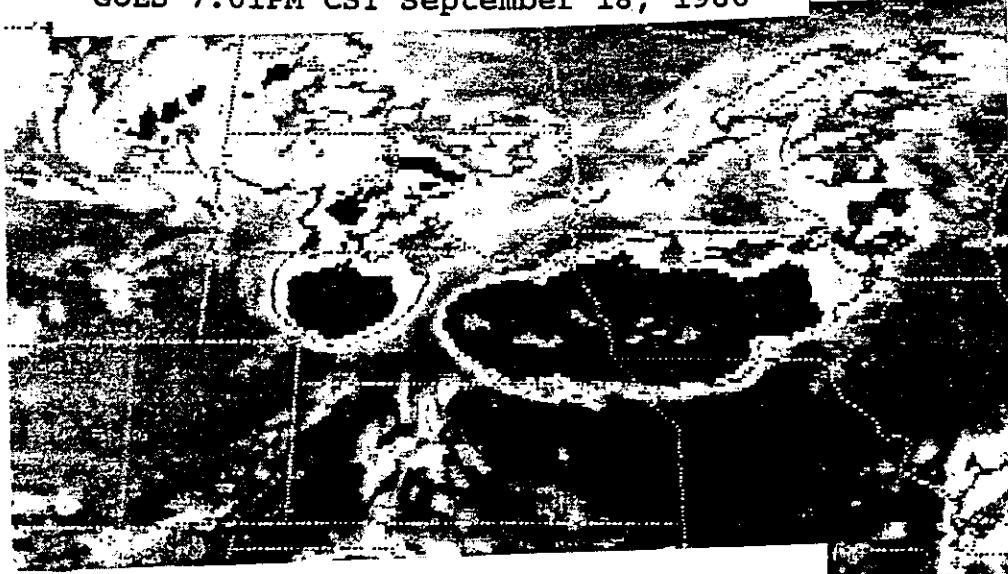
500MB 6PM CST September 18, 1986



GOES 6:01AM CST September 18, 1986

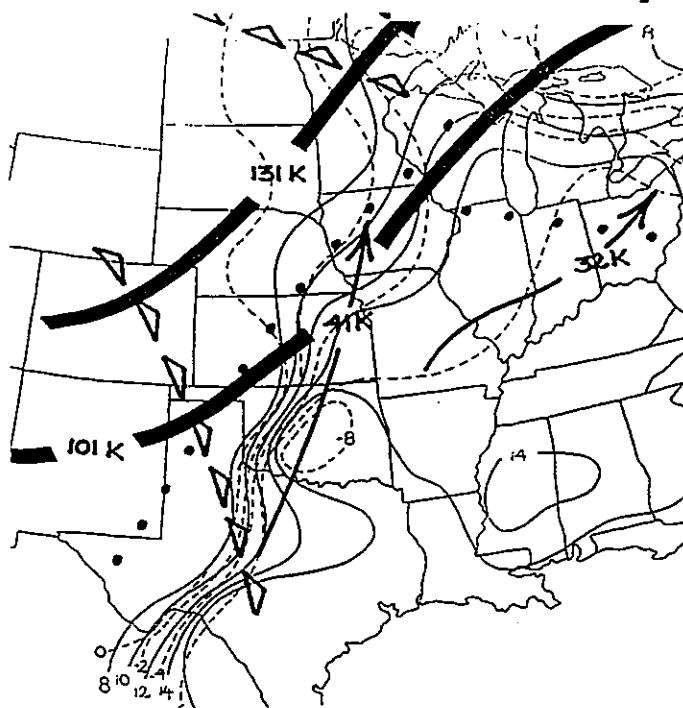


GOES 7:01PM CST September 18, 1986



GOES 10PM CST September 18, 1986

No. 26 September 26 1986

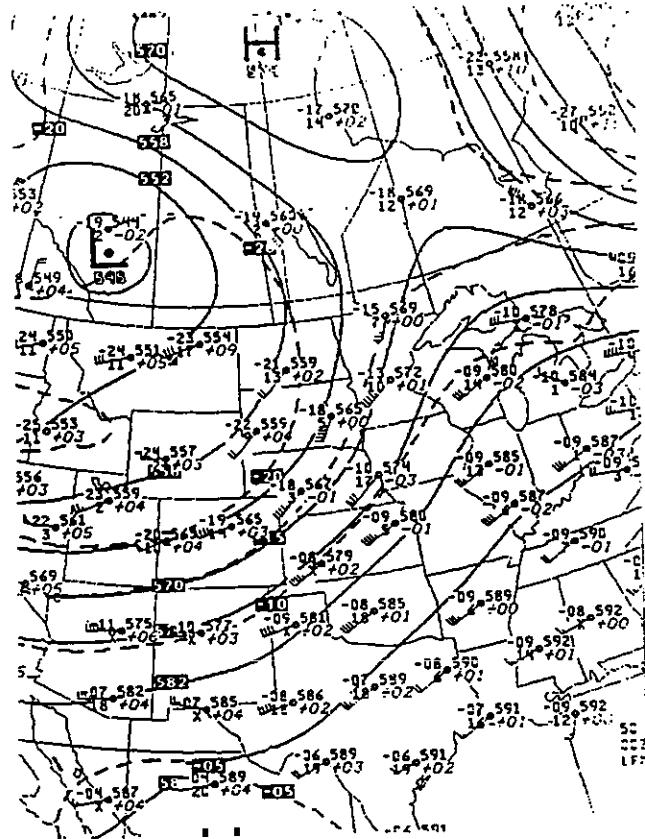


NO	TIME	EVENT	ST	LOCATION	INJURY
1	1410	81 MPH WINDS	IN	ELKHART	
2	1630	F-1 TORNADO	WI	THORP	1 INJURY



26SEP86 0550-2035 CST 56 REPORTS 4 TORNADOES

Composite 6PM CST September 26, 1986

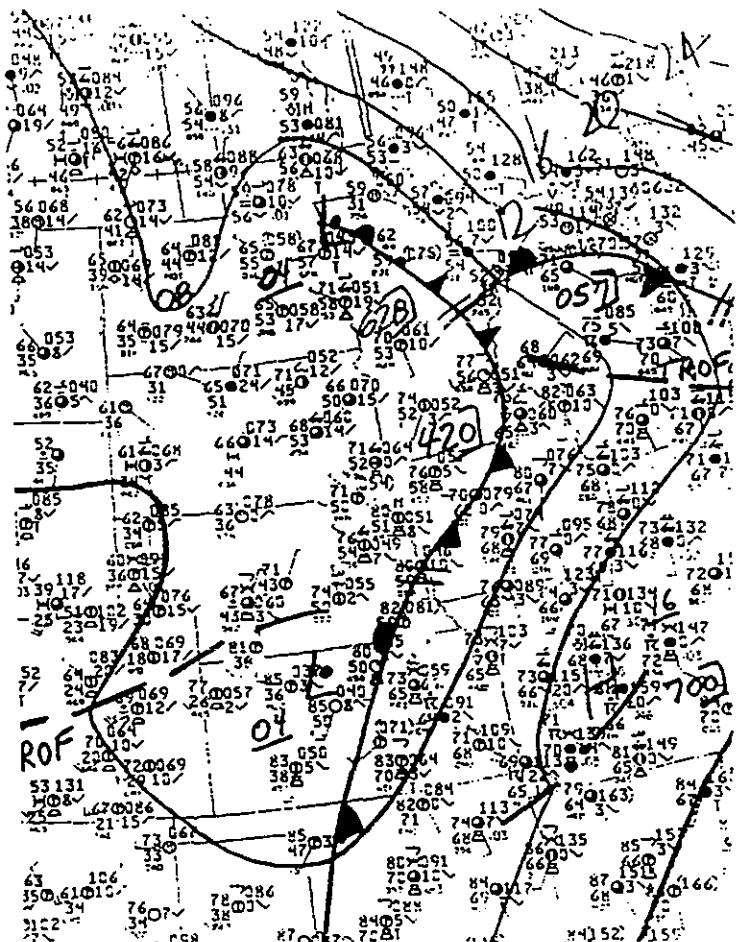


NO	TIME	EVENT	ST	LOCATION
1	1740	F-2 TORNADO	DC	COWETH

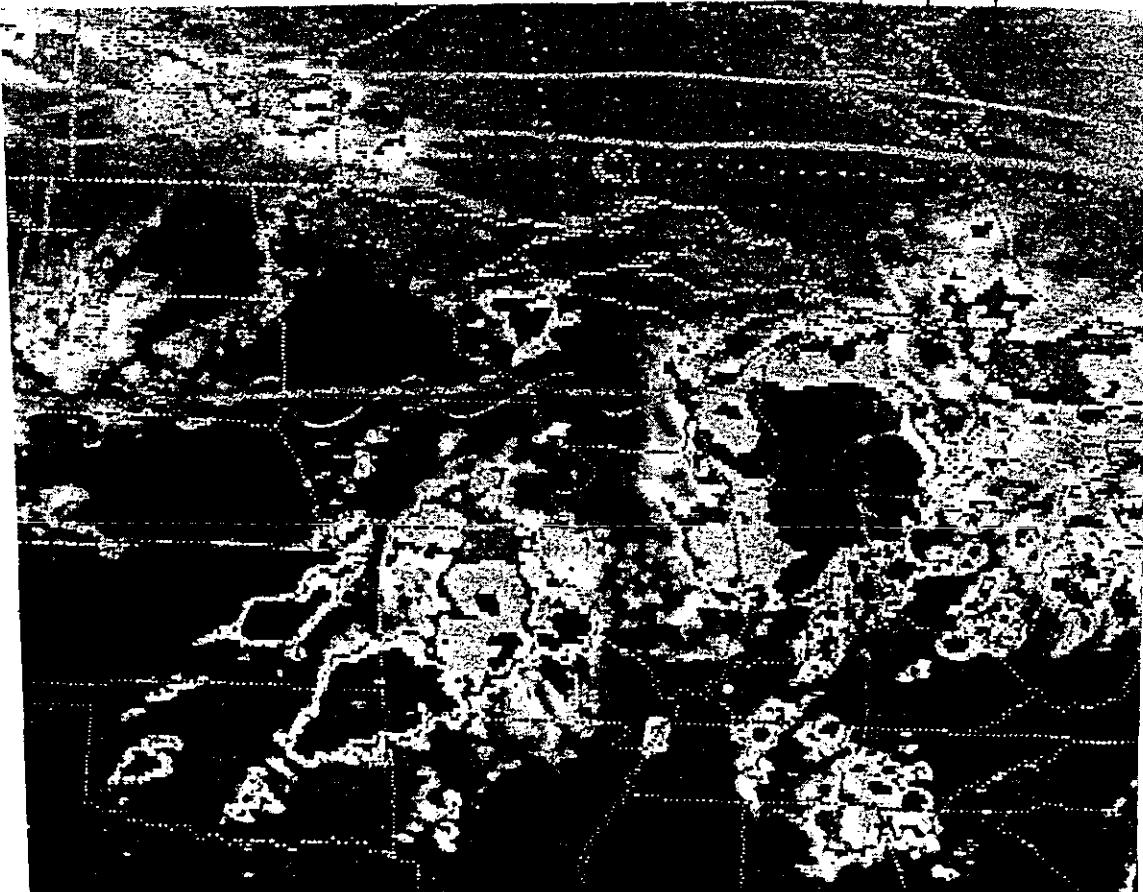


26SEP86 1156-2201 CST 34 REPORTS 2 TORNADOES

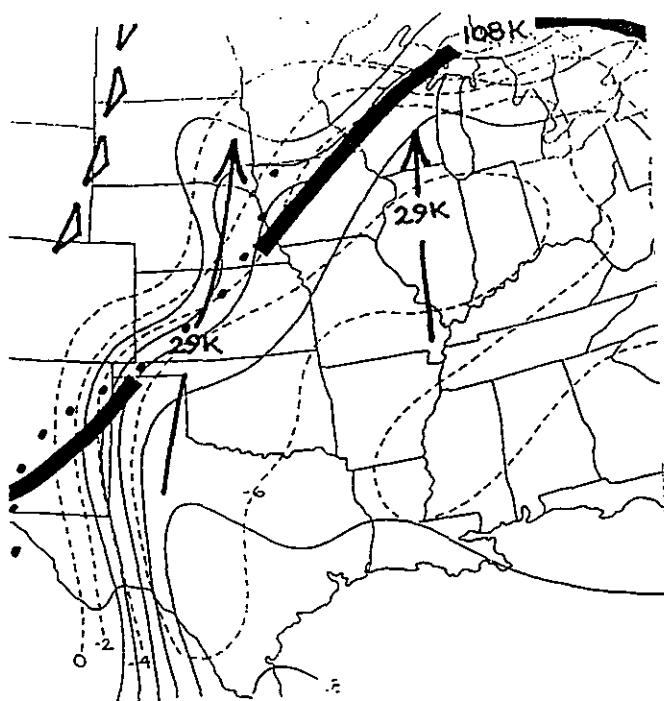
500MB 6PM CST September 26, 1986



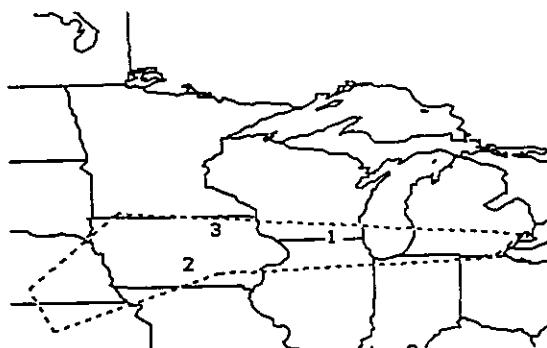
Surface 6PM CST September 26, 1986



GOES 4PM CST September 26, 1986

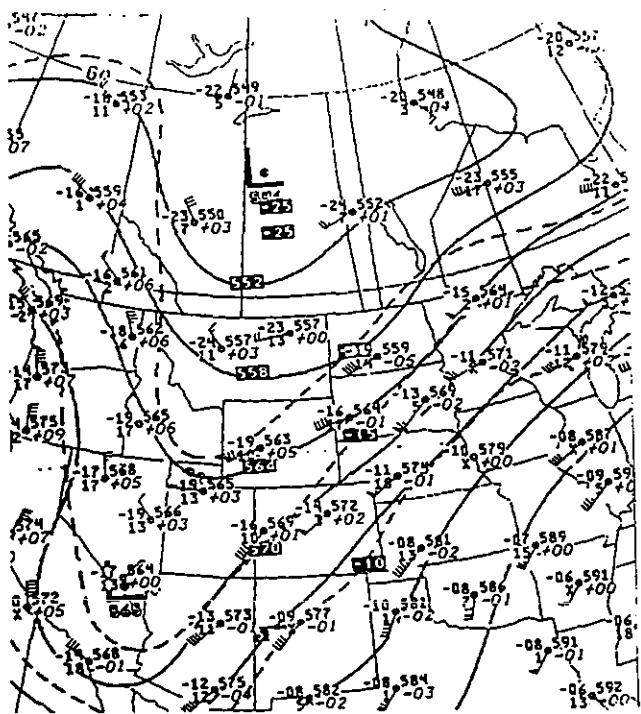


NO	TIME	EVENT	ST	LOCATION	
1	1623	F-2 TORNADO	WI	WHITEWATCH	1 INJURY
2	1634	F-4 TORNADO	IA	PARRA	+2 MILLION DAMAGE
3	2040	F-2 TORNADO	IA	COLWELL	2 INJURIES

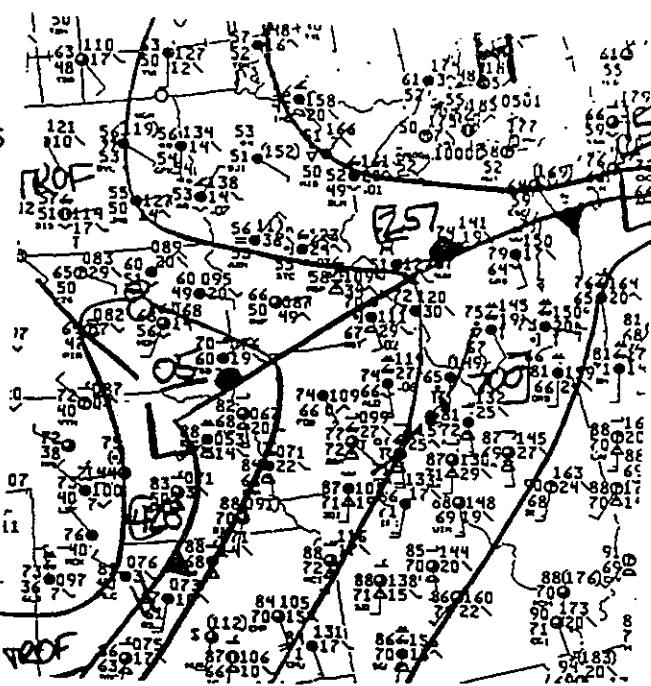


28SEP86 1415-2310 CST 46 REPORTS 7 TORNADOES

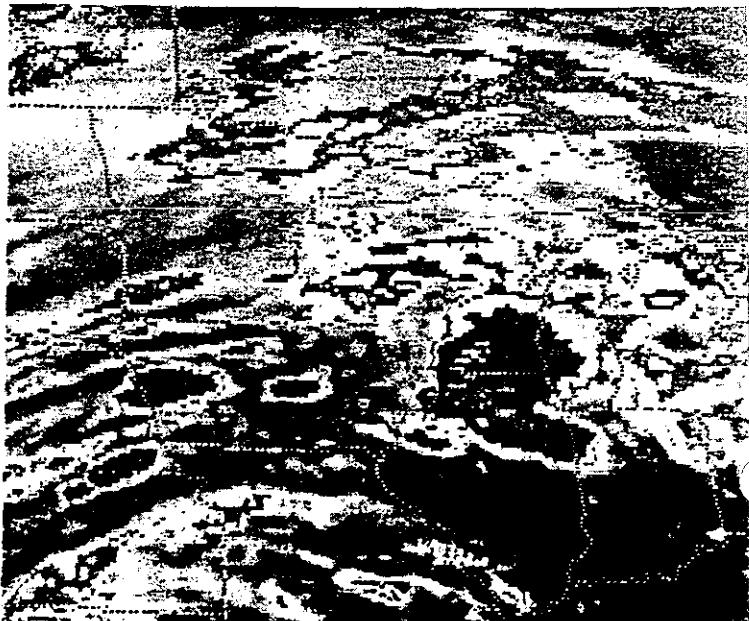
Composite 6PM CST September 28, 1986

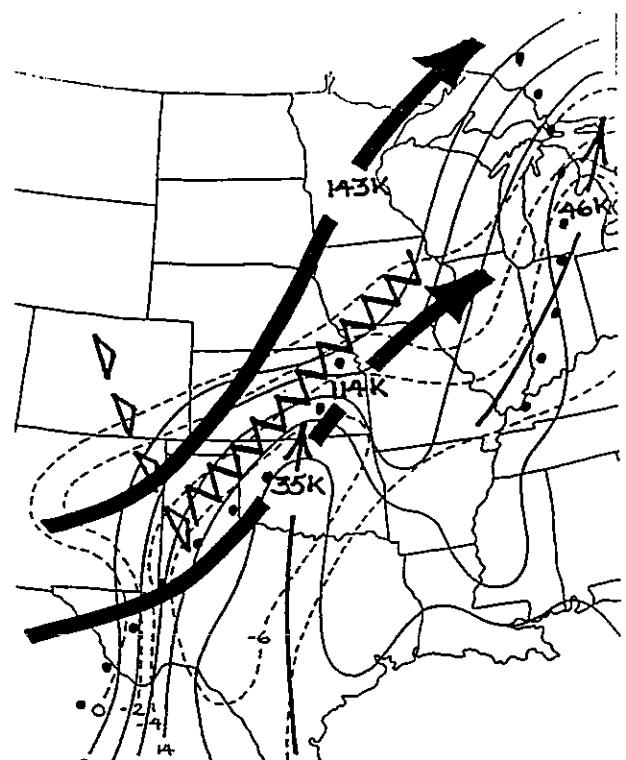


500MB 6PM CST September 28, 1986

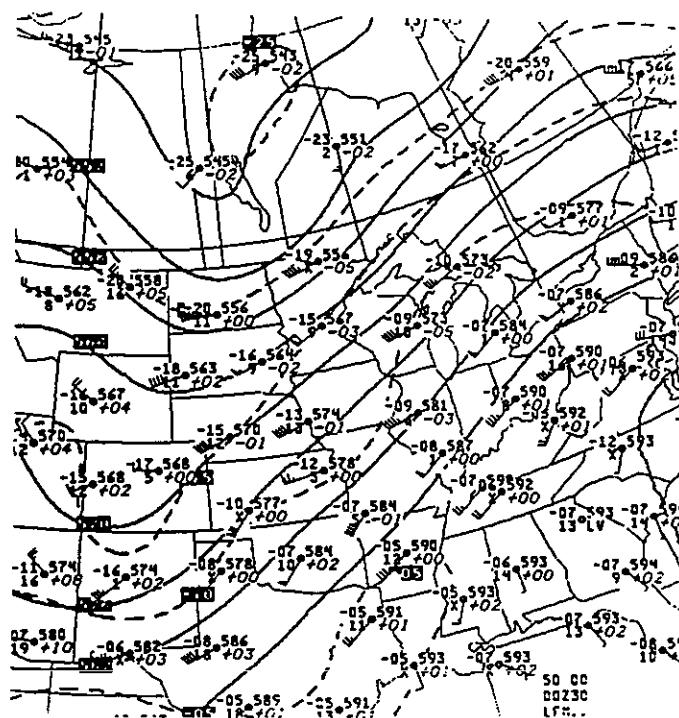


Surface 3PM CST September 28, 1986



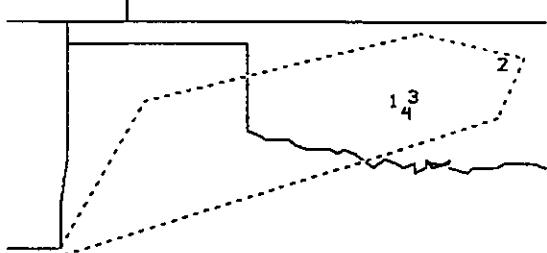


Composite 6AM CST September 29, 1986



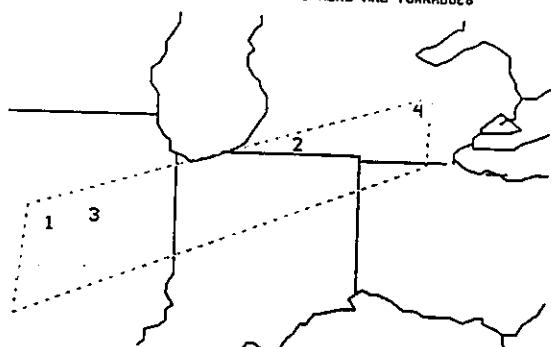
500MB 6AM CST September 29, 1986

NO	TIME	EVENT	ST	LOCATION	
1	0520	WINDS	OK	OKLAHOMA CITY	\$1 MILLION DAMAGE
	0713	F-2 TORNADO	OK	CATOGA	1 INJURY
3	1925	F-2 TORNADO	OK	CHOCATAN	3 INJURIES
	1330	F-2 TORNADO	OK	MIDWEST CITY	3 INJURIES

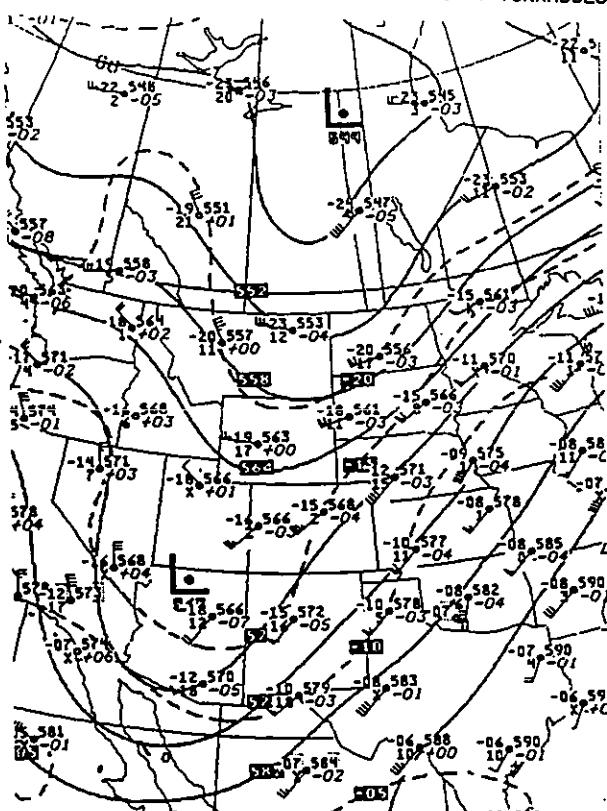


29SEP86 0330-2100 CST 47 REPORTS 5 TORNADOES

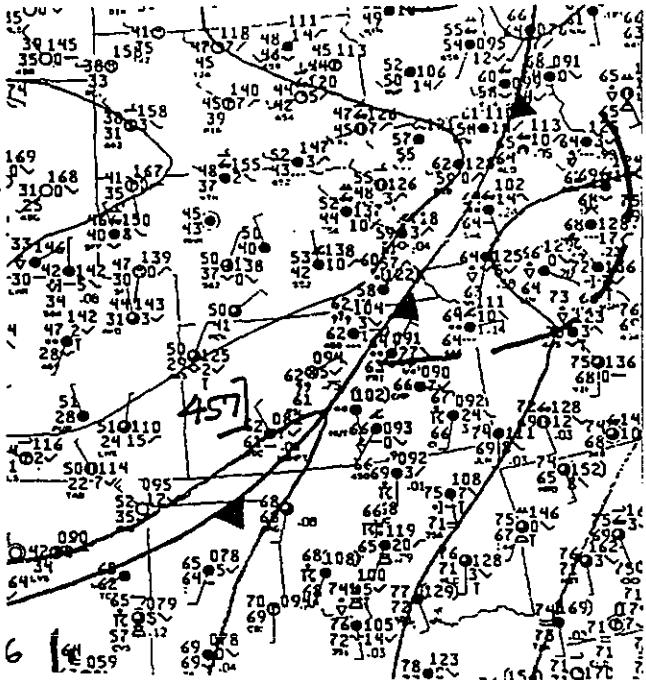
NU	TIME	EVENT	ST	LOCATION	
1	1430	F-2 TORNADO	IL	HOPEDALE*	
2	1530	F-2 TORNADO	MI	PAW PAW	
3	1634	F-2 TORNADO	IL	LEXINGTON*	1 INJURY
4	1731	TORNADO	MI	RANKIN	
*4-23 MILTON DOLLARD SOURCE					



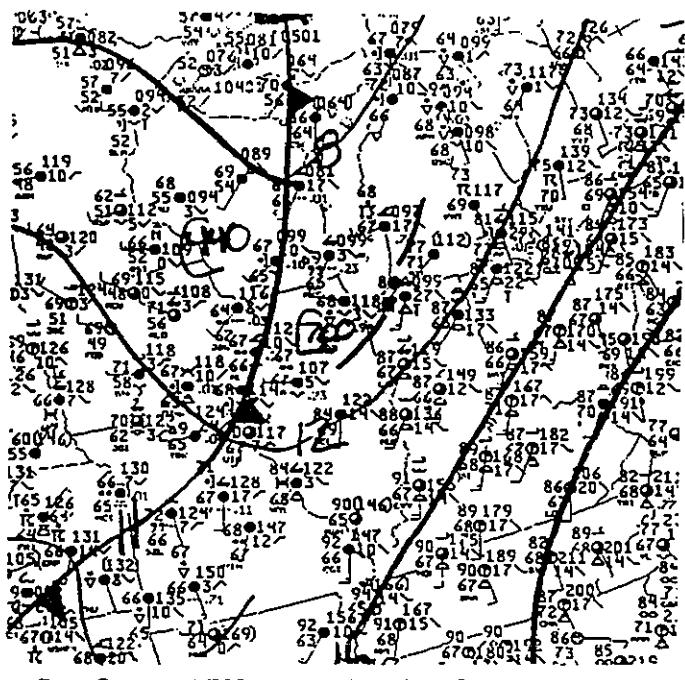
29SEP86 1255-2000 CST 19 REPORTS 7 TORNADOES



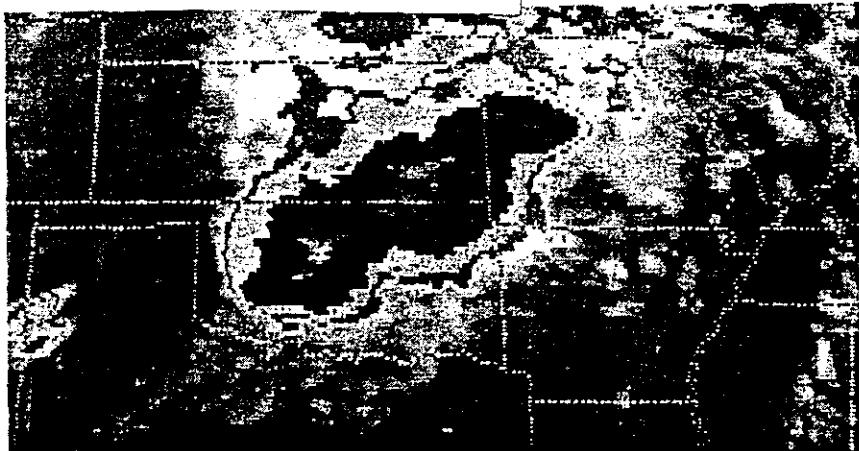
500MB 6PM CST September 29, 1986



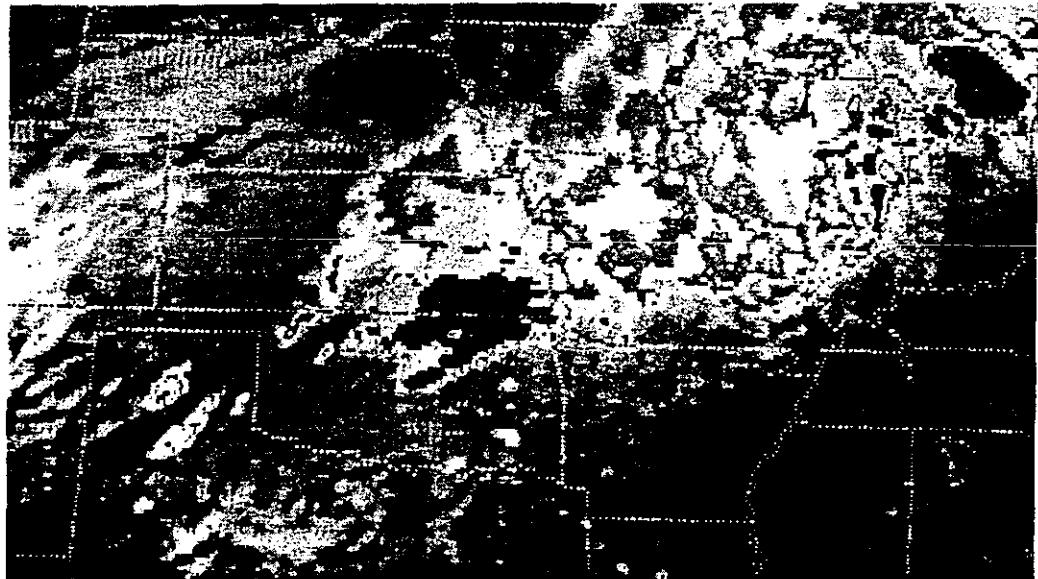
Surface 6AM CST September 29, 1986



Surface 3PM CST September 29, 1986

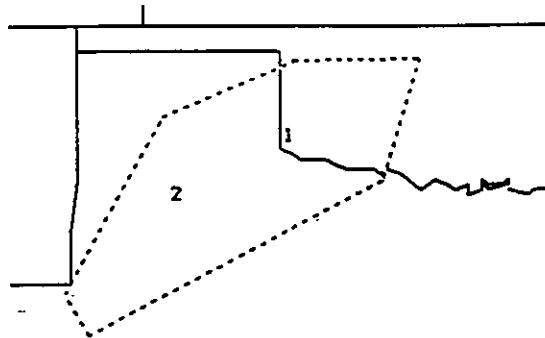


GOES 5:01AM CST September 29, 1986



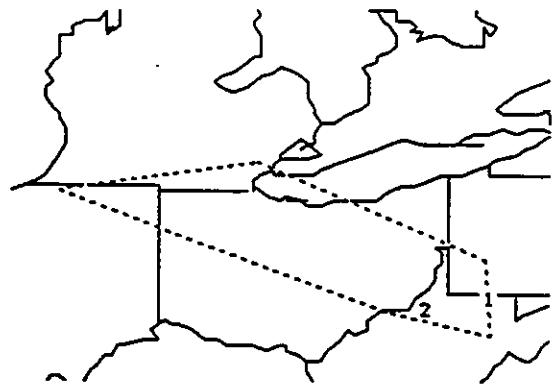
GOES 3PM CST September 29, 1986

NO	TIME	EVENT	ST	LOCATION
1	1700	4.00 INCH WHIL	TX	PETERSONNG
2	1815	F-1 TORNADO	OK	MCKNIGHT

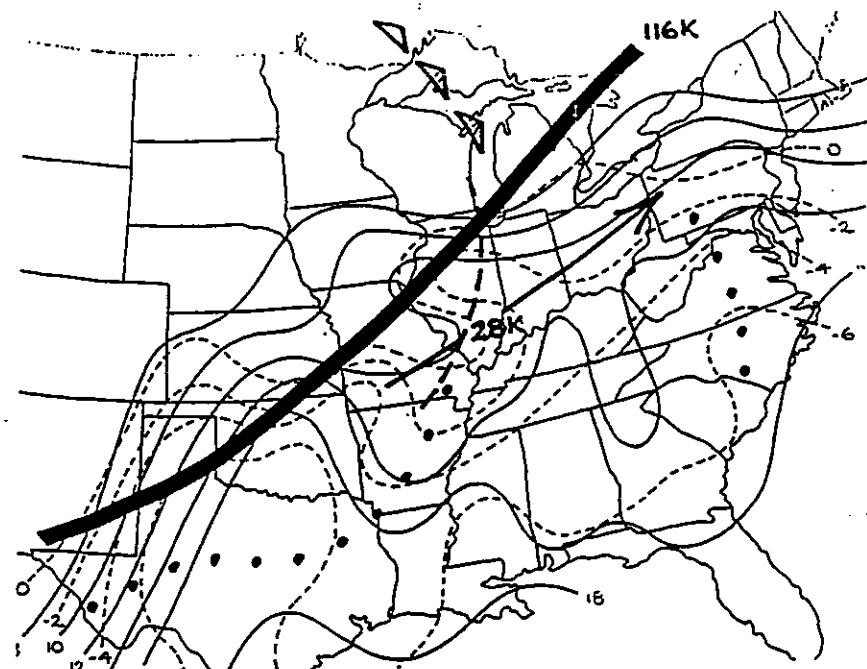


01OCT86 1610-2125 CST 34 REPORTS 4 TORNADOES

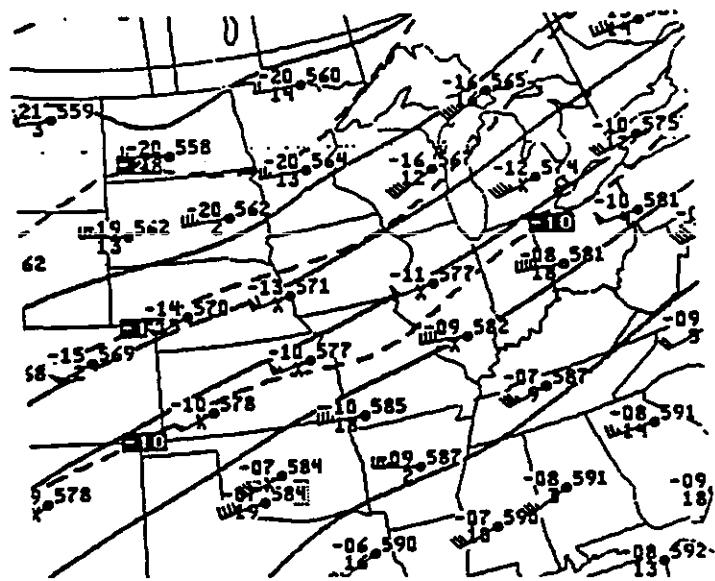
NO	TIMI	EVN#	ST	LUCHELINE	
1	1440	F-2 TORNADO	PA	UNIONTOWN	2 INJURIES
2	1630	F-3 TORNADO	WV	WEST UNION	1 INJURY



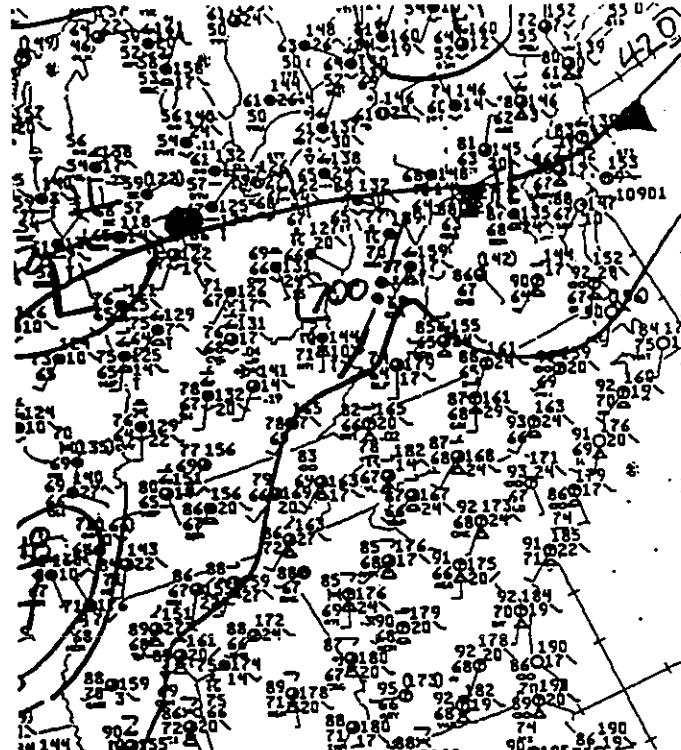
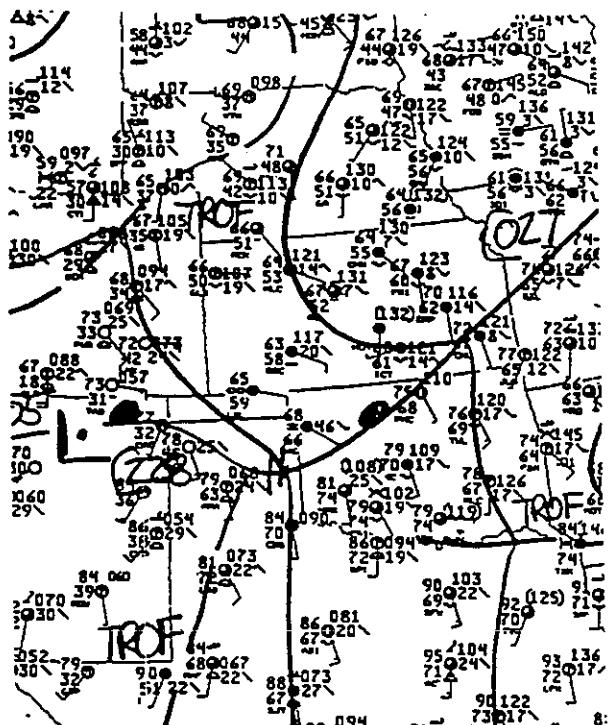
01OCT86 0900-1715 CST 8 REPORTS 4 TORNADOS



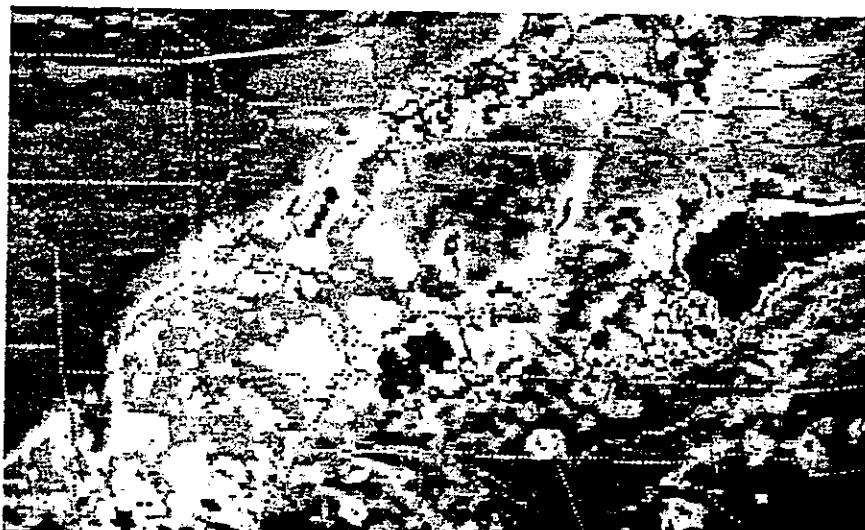
Composite 6PM CST October 1, 1986



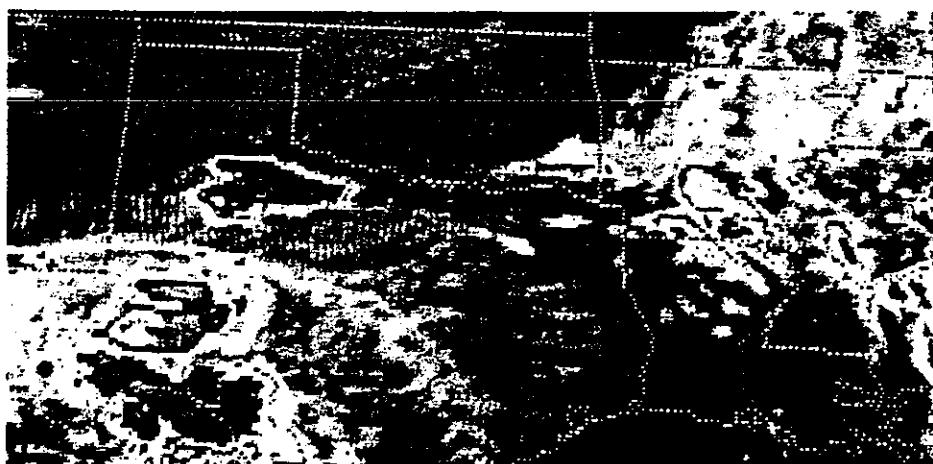
500MB 6PM CST October 1, 1986



Surface 3PM CST October 1, 1986



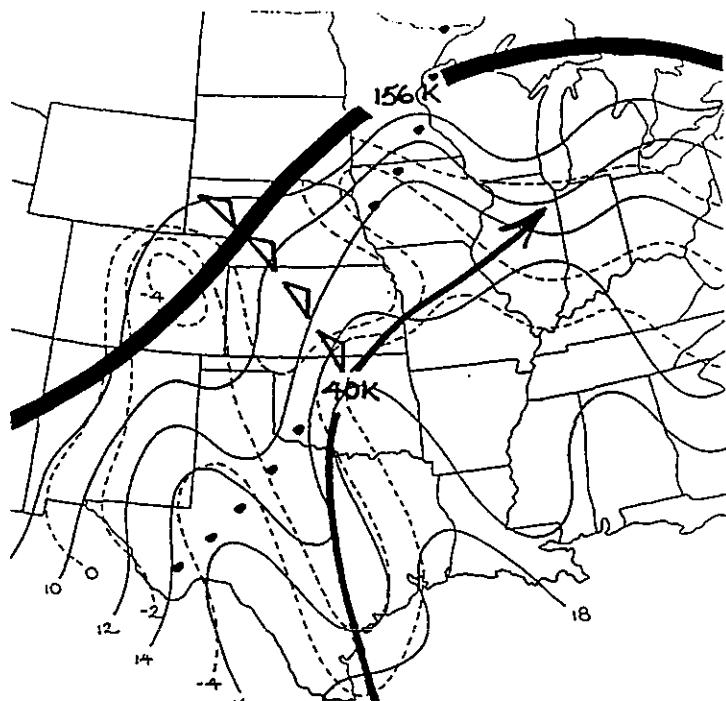
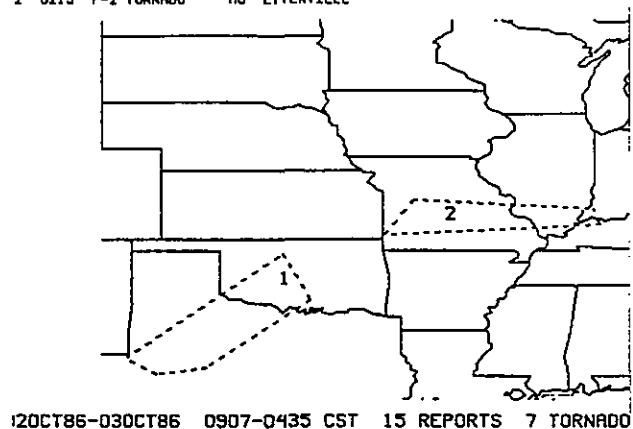
GOES 3PM CST October 1, 1986



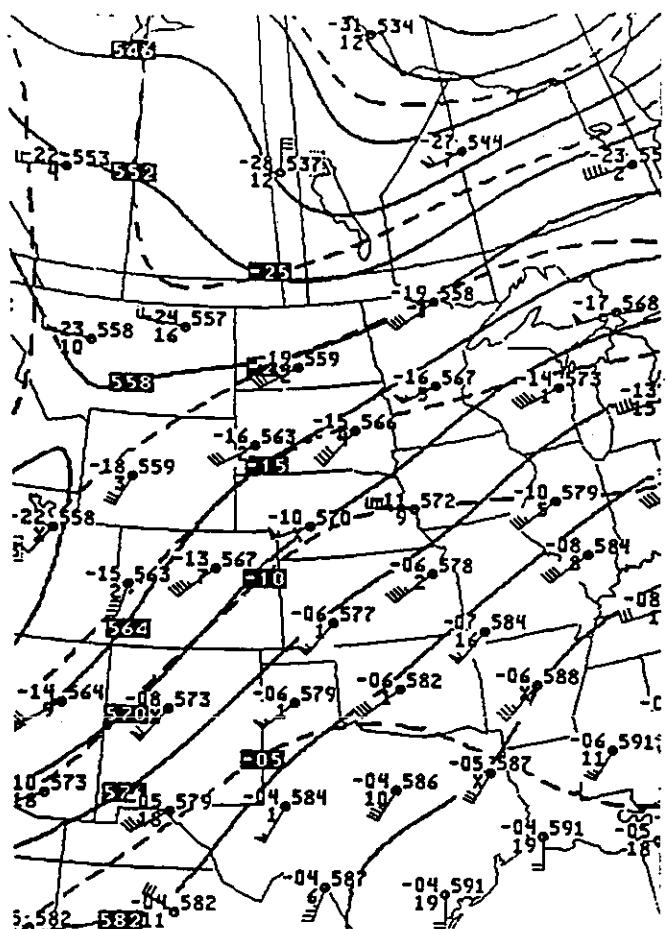
GOES 5PM CST October 1, 1986

No. 30 October 2 1986

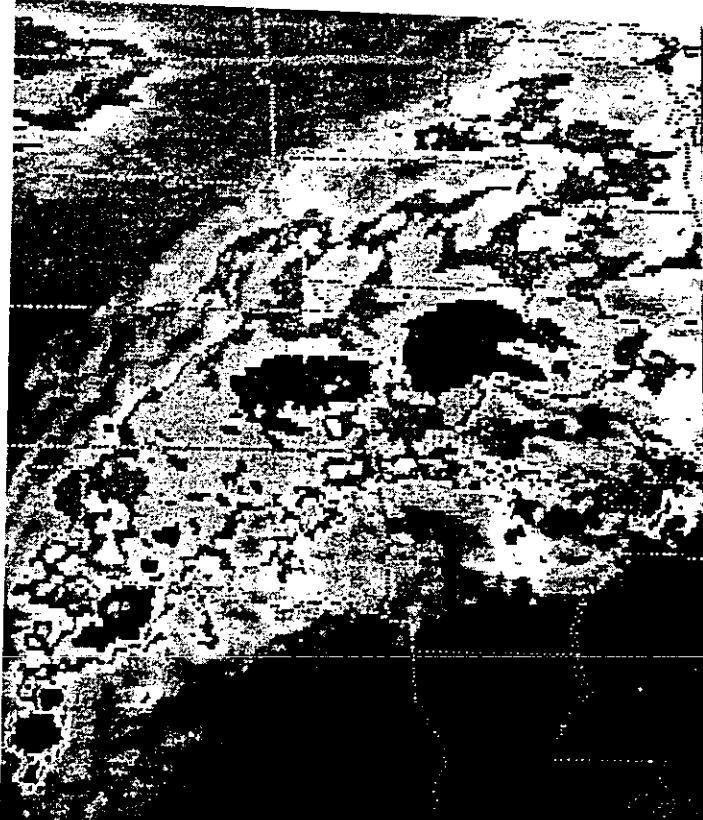
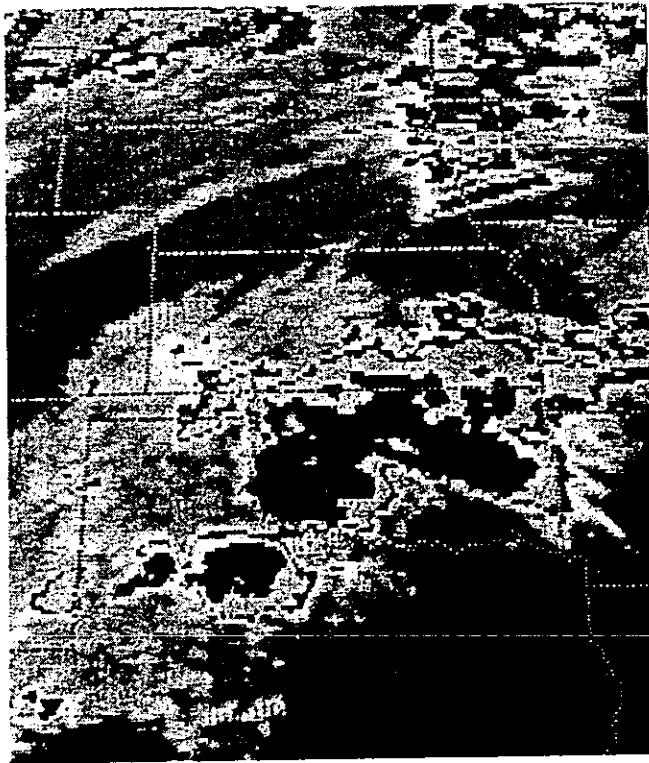
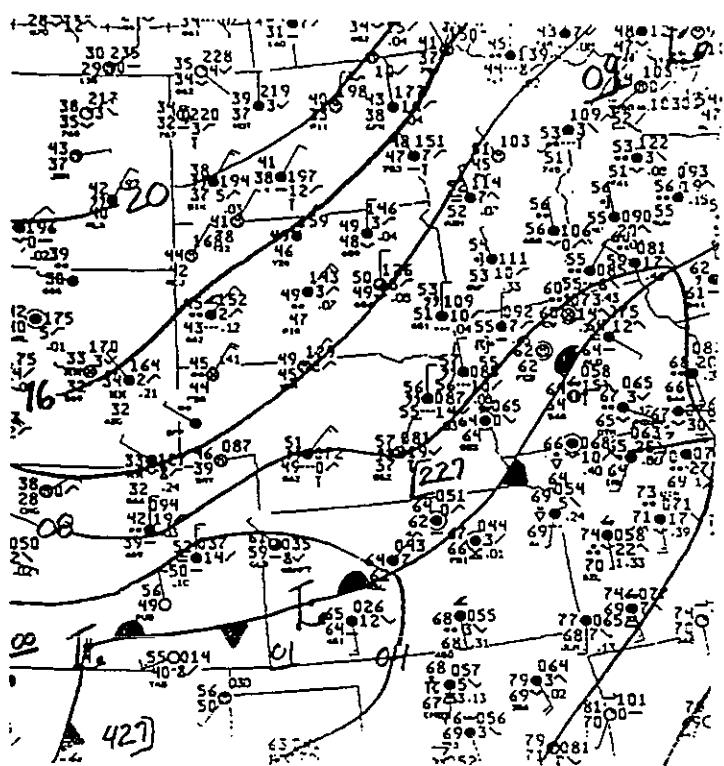
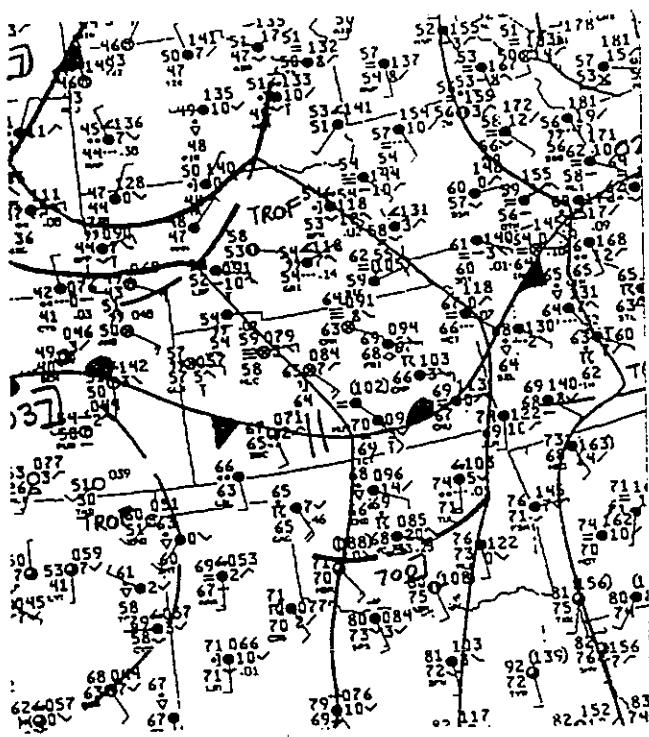
#	TIME	EVENT	ST	LOCATION
1	0807	F-1 TORNADO	OK	OKLAHOMA CITY #0.6 MILLION DAMAGE
2	0212	F-2 TORNADO	MO	CITRUSVILLE

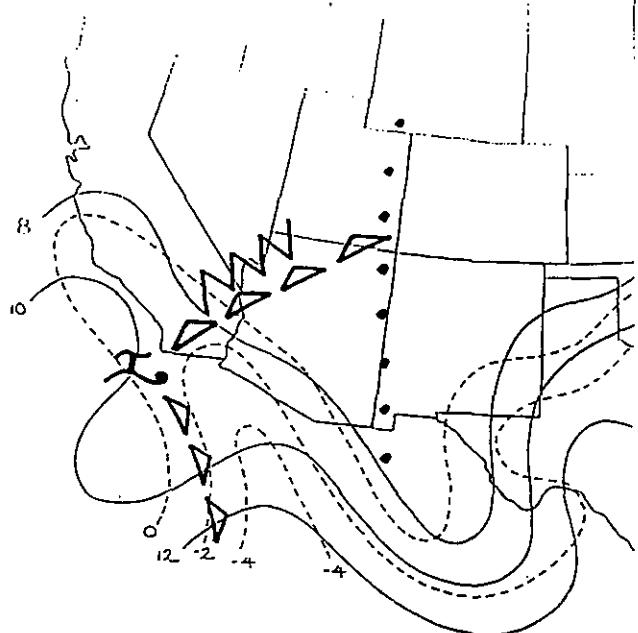


Composite 6PM CST October 2, 1986

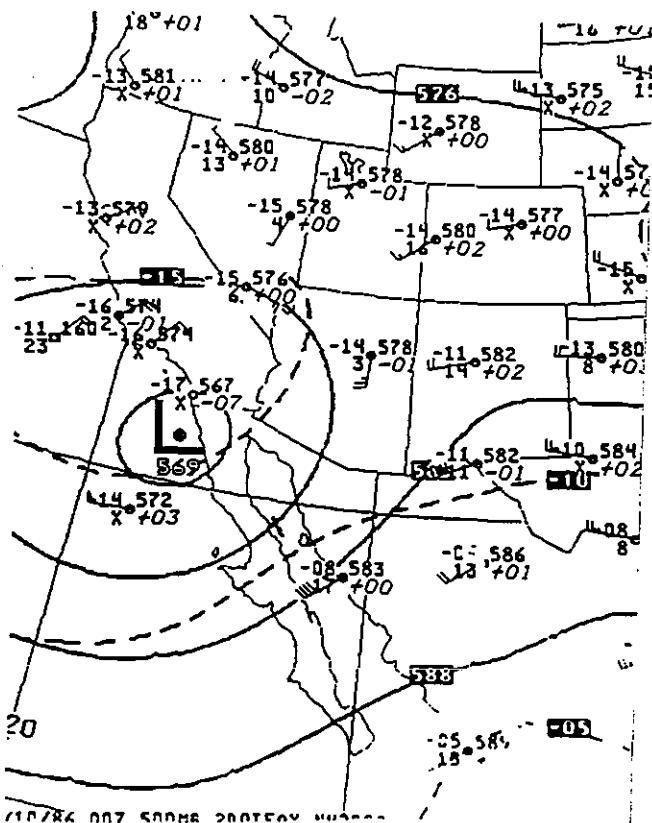


500MB 6PM CST Ocotober 2, 1986



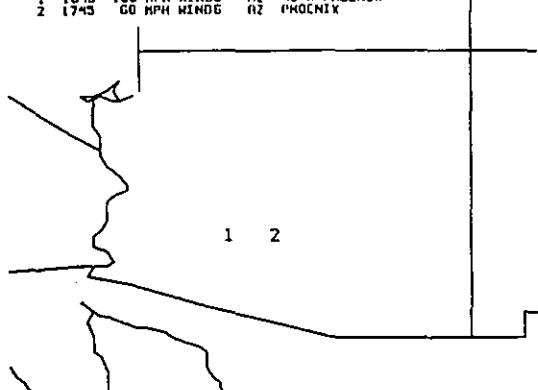


Composite 6PM CST October 9, 1986

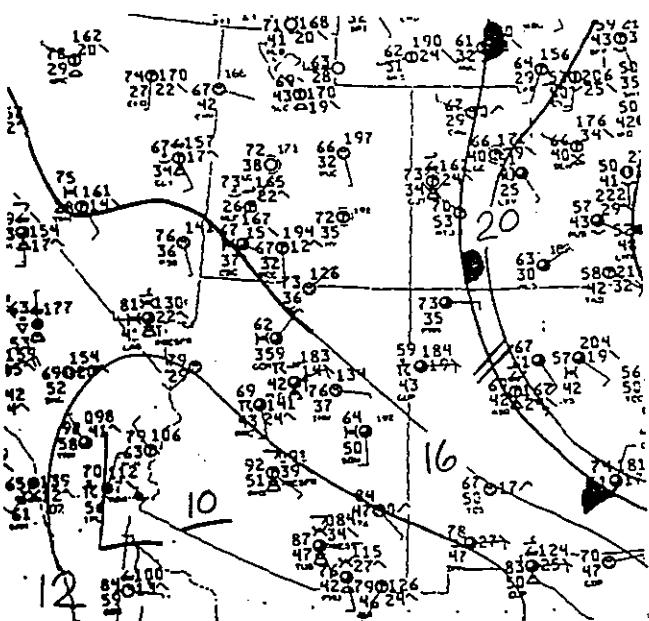


500MB 6PM CST October 9. 1986

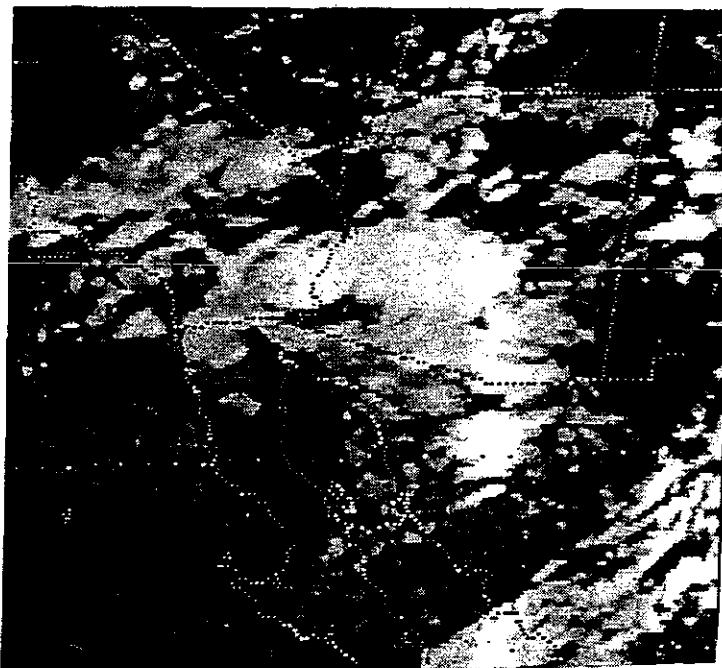
NO	TIME	EVENT	GT	LOCATION
1	1643	100 MPH WINDS	AZ	40 W PHOENIX
2	1743	60 MPH WINDS	AZ	PHOENIX

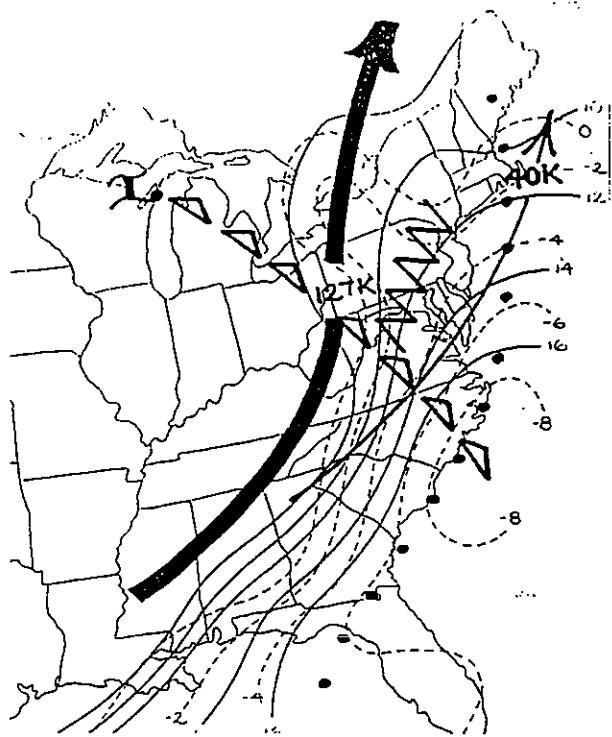


09OCT86 SEVERE THUNDERSTORMS IN ARIZONA

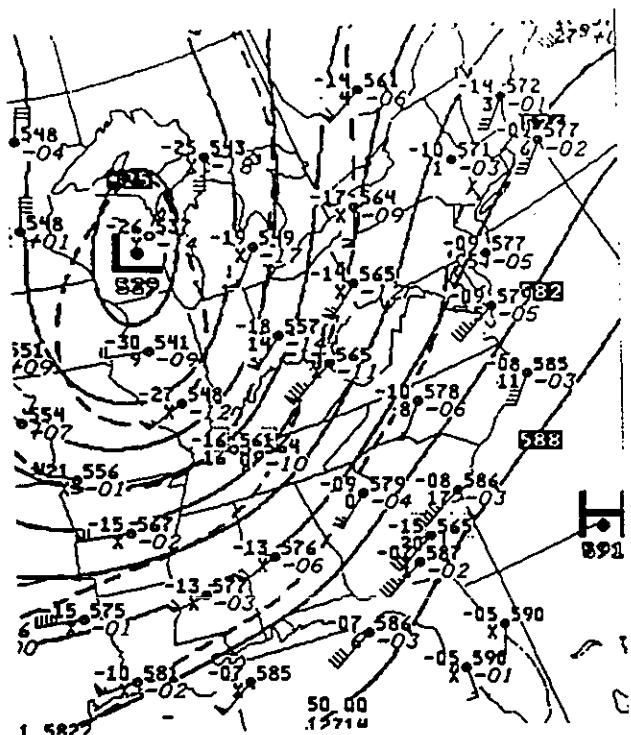


Surface 3PM CST October 9, 1986





Composite 6AM CST October 14, 1986

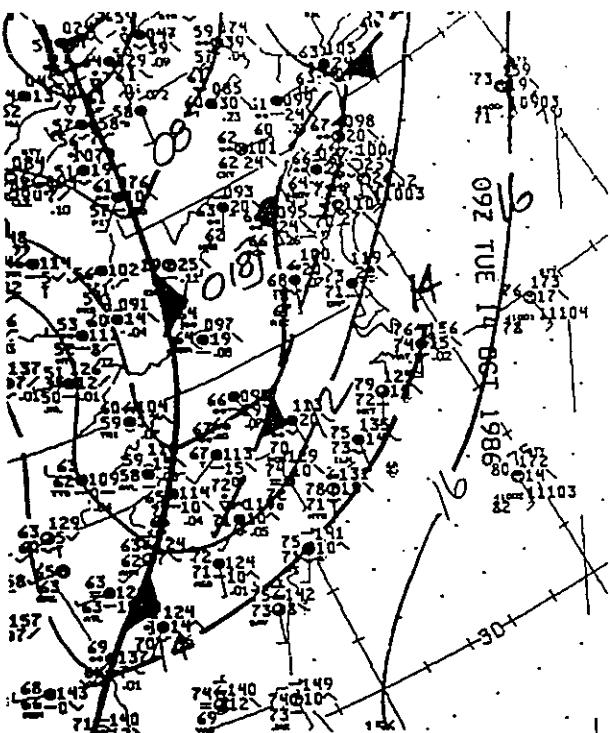


500MB 6AM CST October 14, 1986

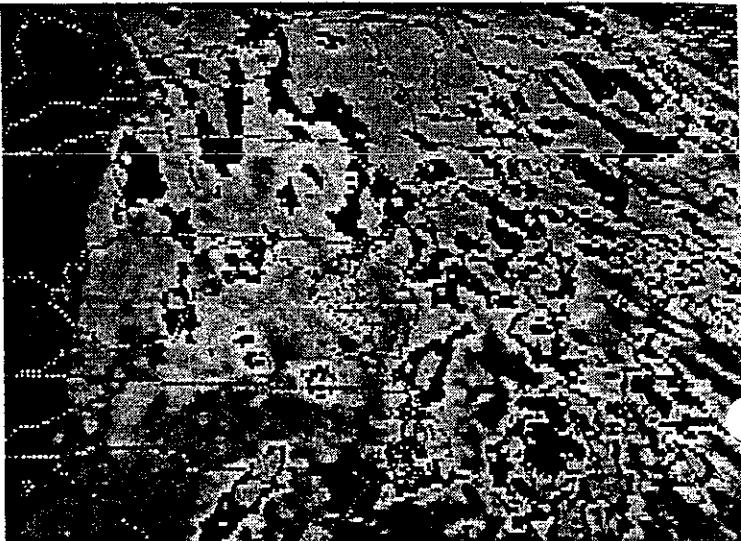
NO	TIME	EVNT	ST	LOCATION
1	0430	F-3 TORNADO	VA	LAWRENCEVILLE #1 MILLION DAMAGE
2	0603	F-3 TORNADO	VA	SANDY POINT
3	0620	F-2 TORNADO	VA	CARSON
4	0620	F-2 TORNADO	VA	HOPENWELL

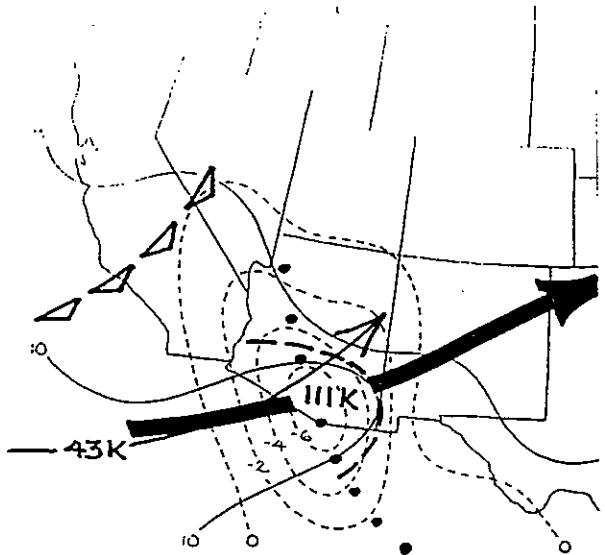


14OCT86 VIRGINIA TORNADOES

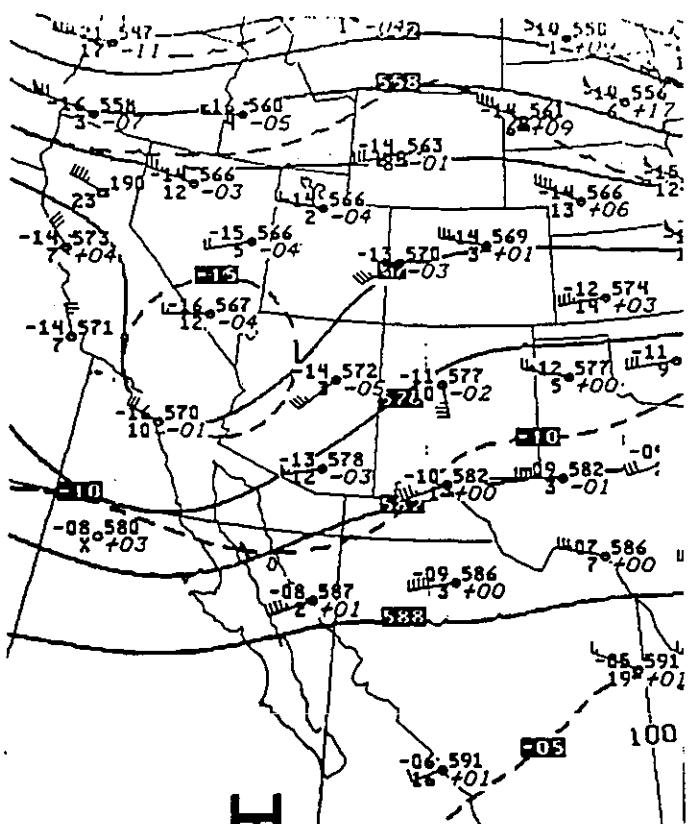


Surface 3AM CST October 14, 1986



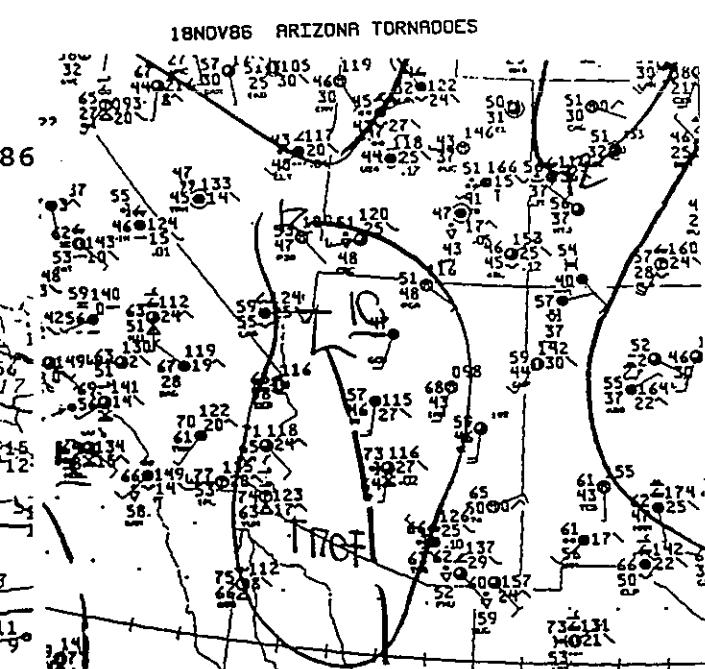


Composite 6PM CST November 18, 1986

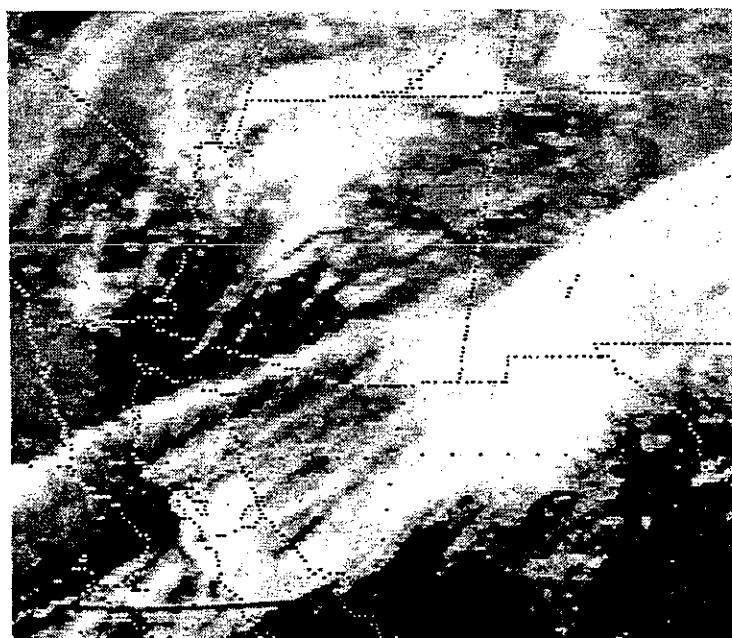


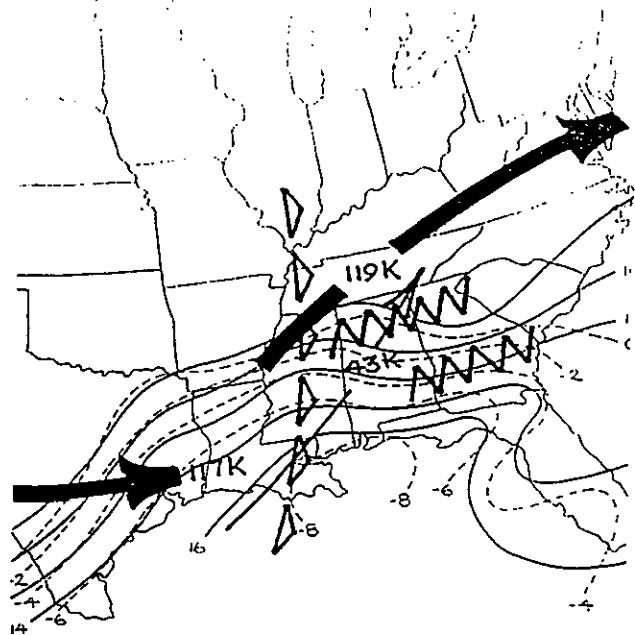
500MB 6PM CST November 18, 1986

NO	TIME	EVENT	ST	LOCATION
1	1630	F-0 TORNADO	AZ	ELDORADO
2	1804	F-1 TORNADO	AZ	APACHE JUNCTION

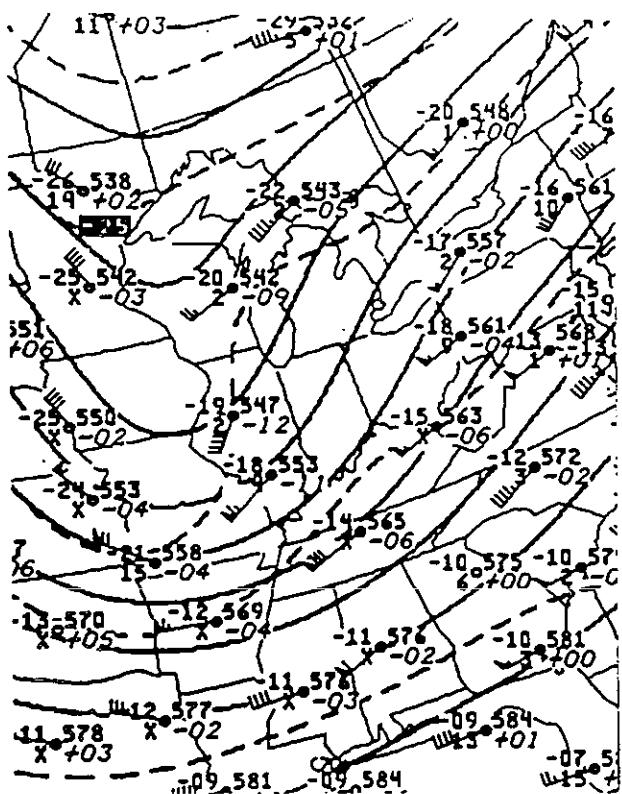


Surface 3PM CST November 18, 1986



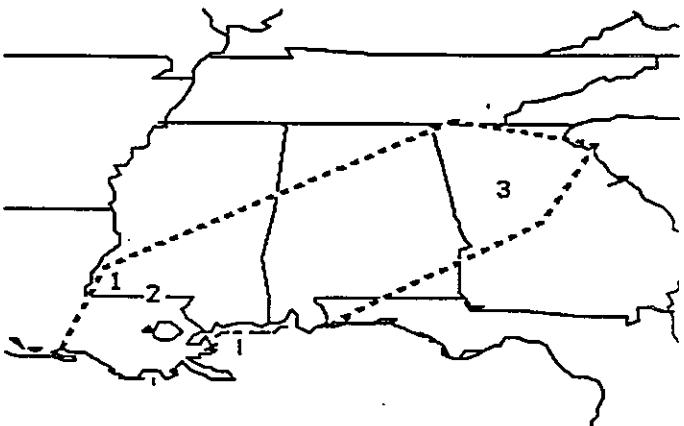


Composite 6AM CST November 20, 1986

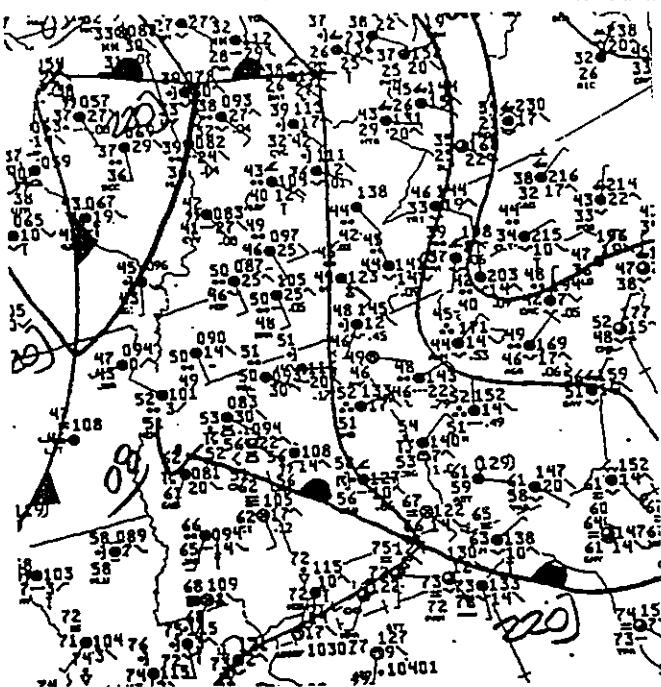


500MB 6AM CST November 20, 1986

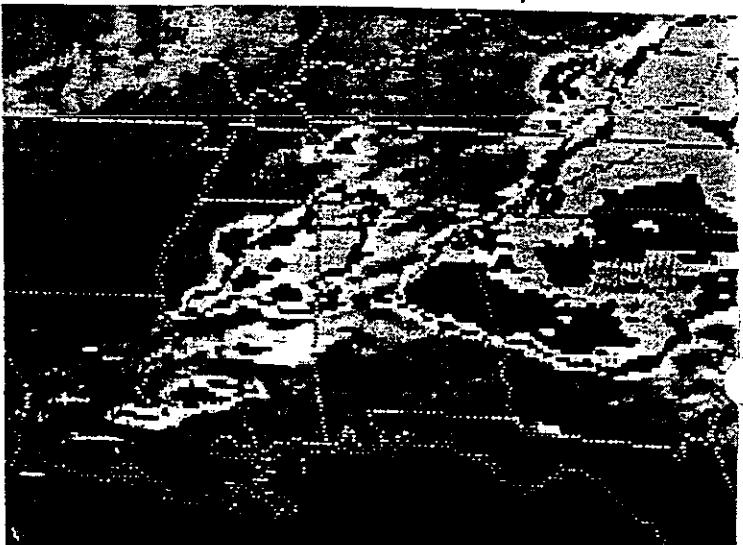
NO	TIME	EVENT	ST	LOCATION	
1	0303	F-2 TORNADO	MS	WHITTRAKER	
2	0415	F-1 TORNADO	MS	13 SE MAGNOLIA	4 INJURED
3	0815	70 MPH WIND GUST	GA	FULTON COUNTY	1 INJURED

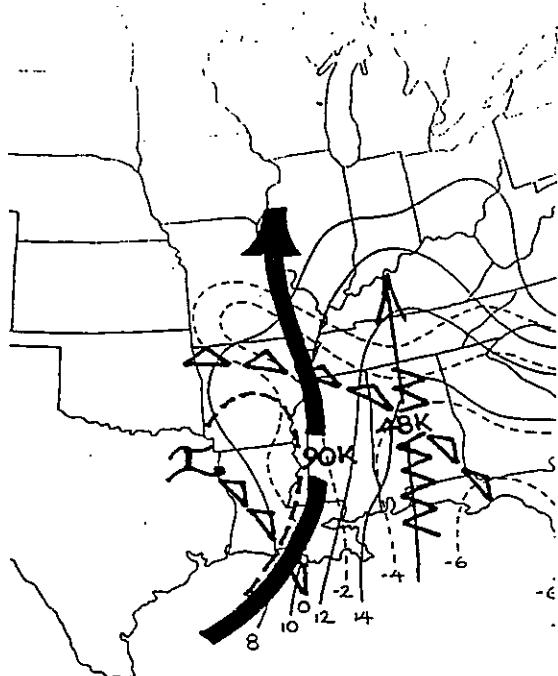


20NOV86 0045-1300 CST 22 REPORTS 2 TORNADOES

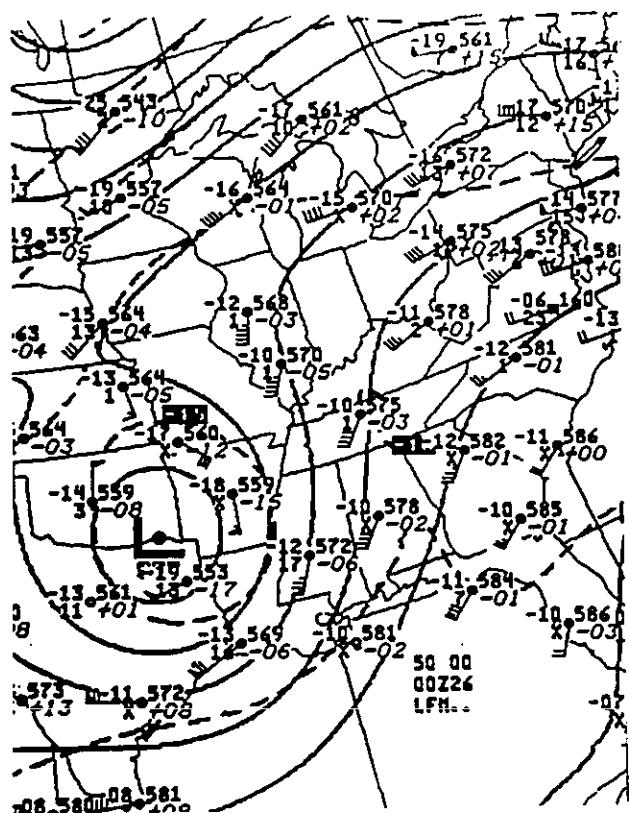


Surface 3AM CST November 20, 1986





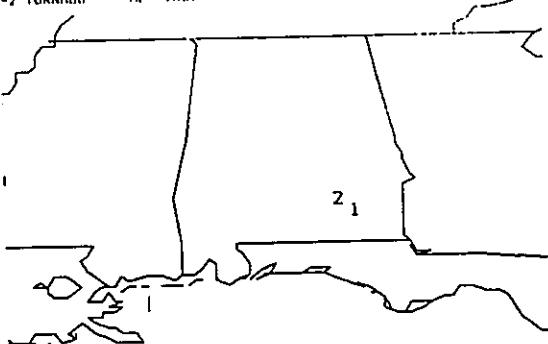
Composite 6PM CST November 25, 1986



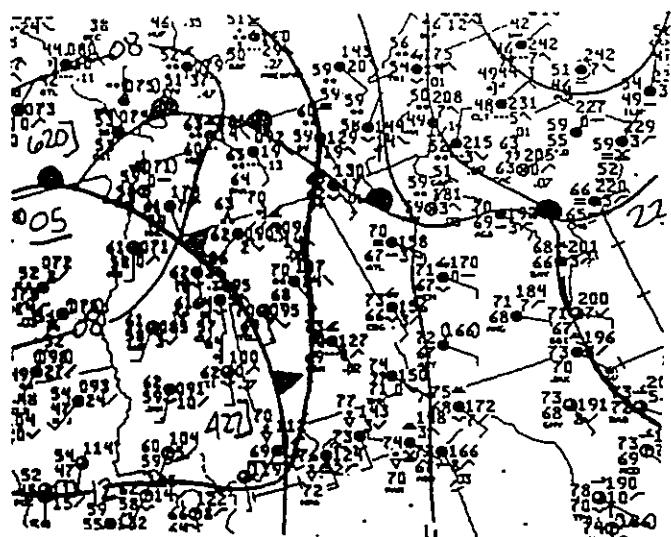
500MB 6PM CST November 25, 1986

NO	TIME	EVENT	LT	LOCATION
1	2120	F-3 TORNADO	0120	NEAR DODGE CITY
2	0120	F-2 TORNADO	0120	TROY

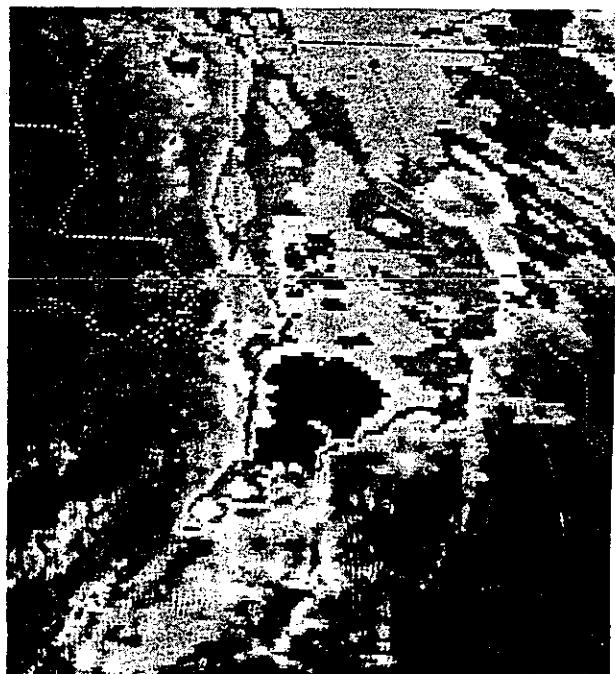
INJURIES: 4 INJURIES 1 INJURY



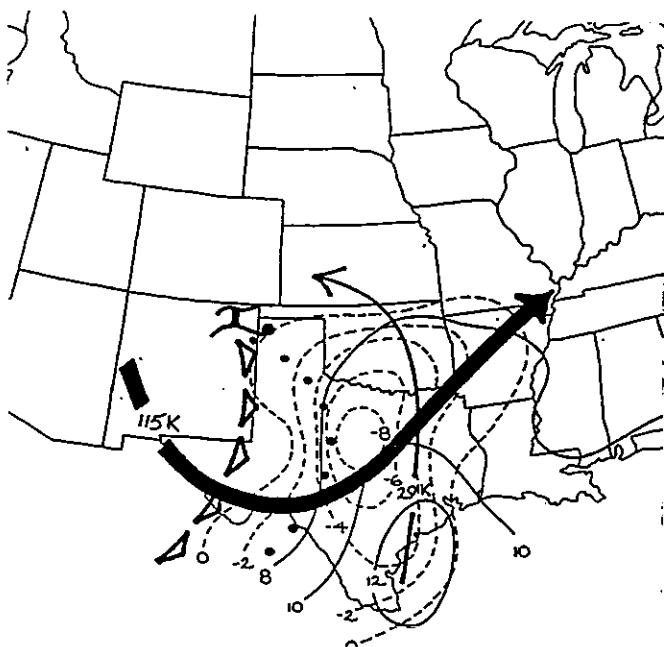
25NOV86-26NOV86 1430-0400 CST 9 REPORTS 4 TORNADOES



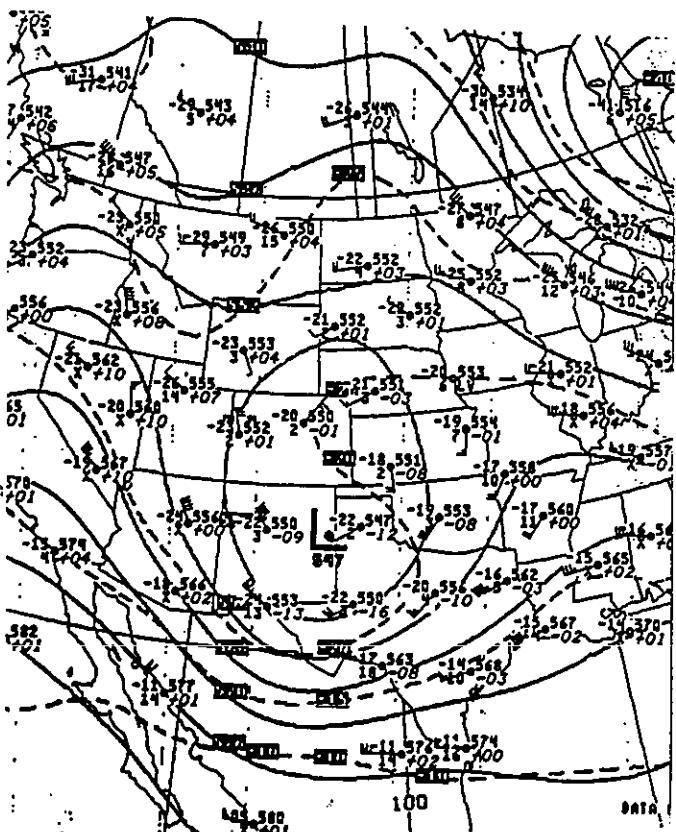
Surface 9PM CST November 26, 1986



GOES 9PM CST November 25, 1986

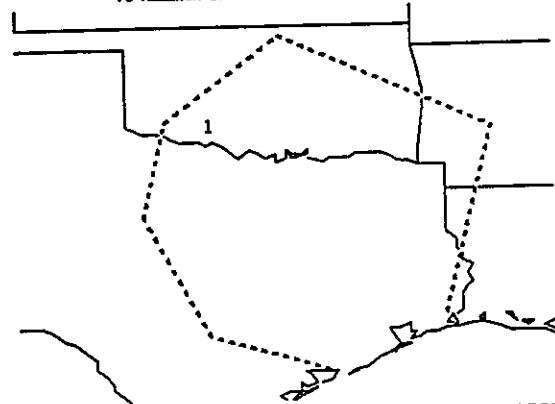


Composite 6PM CST February 14, 1987

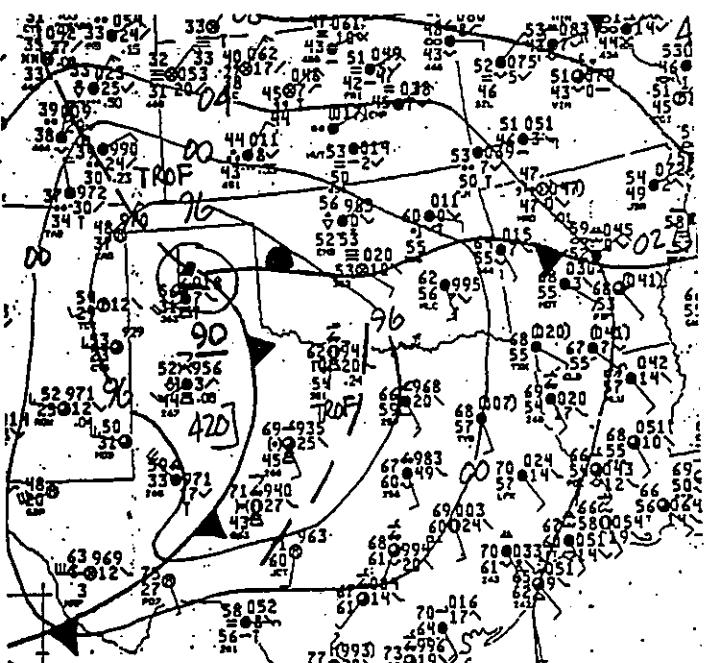


500 MB 6PM CST February 14, 1987

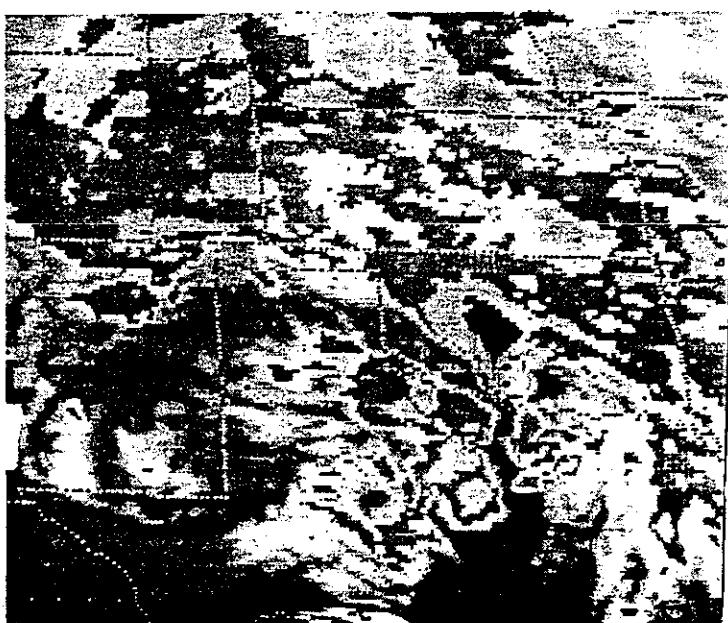
NO	TIME	EVENT	ST	LOCATION
1	1800	TORNADO-F2	OK	MEDICINE PARK 1 INJURY \$6 MILLION DAMAGE

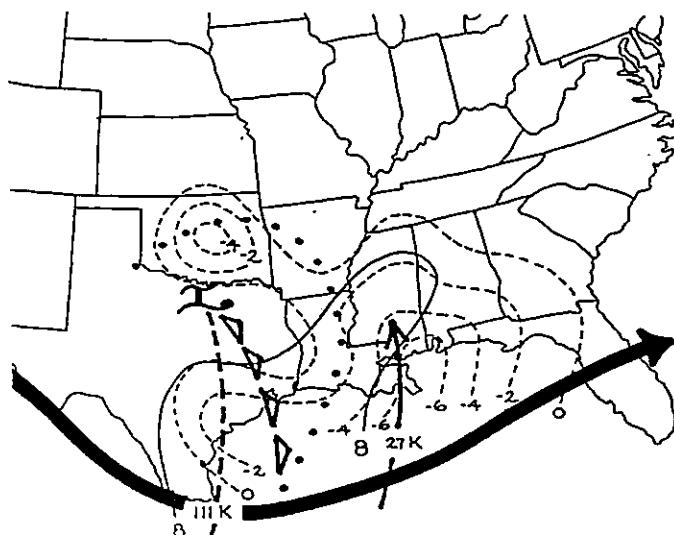


14FEB87-15FEB87 1710-0325 CST 80 REPORTS 3 TORNADOES



Surface 6PM CST February 14, 1987

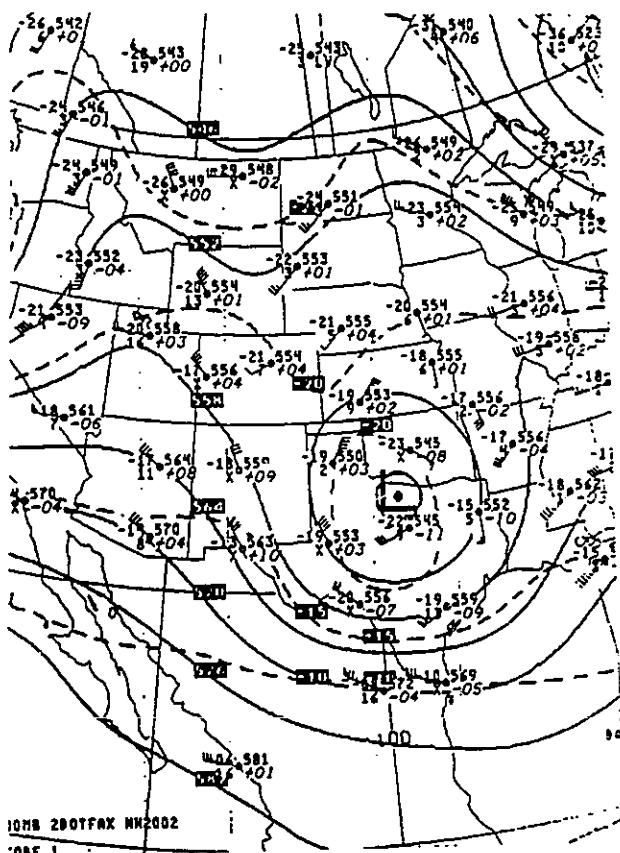




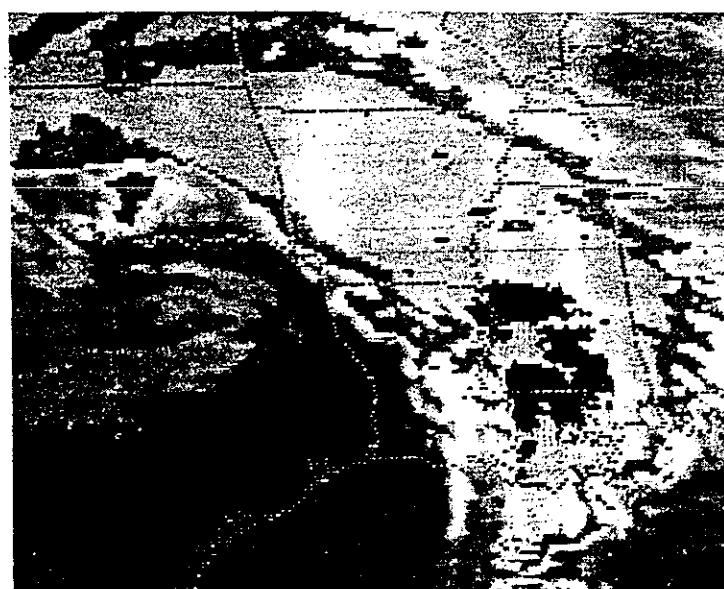
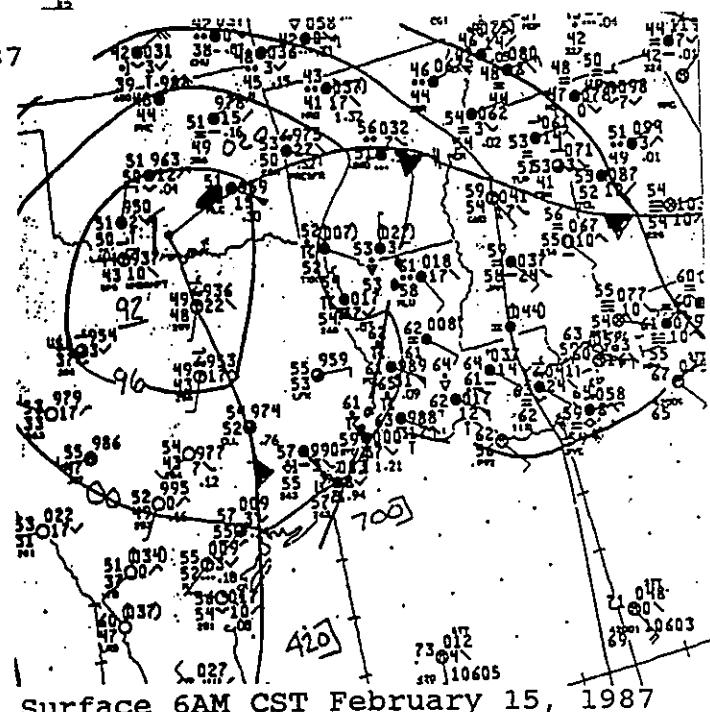
NO	TIME	EVENT	ST	LOCATION	DEATH
1	0620	100 MPH GUST	LA	SULPHUR	1 DEATH
2	1120	TORNADO-F2	LA	PICRAC PASS	1 INJURIES
3	1200	TORNADO-F2	LA	TANGIPAHOR	3 INJURIES
4	1230	TORNADO-F2	MS	LEXIE	2 INJURIES
5	1230	TORNADO-F2	MS	NICKOLSON	2 INJURIES

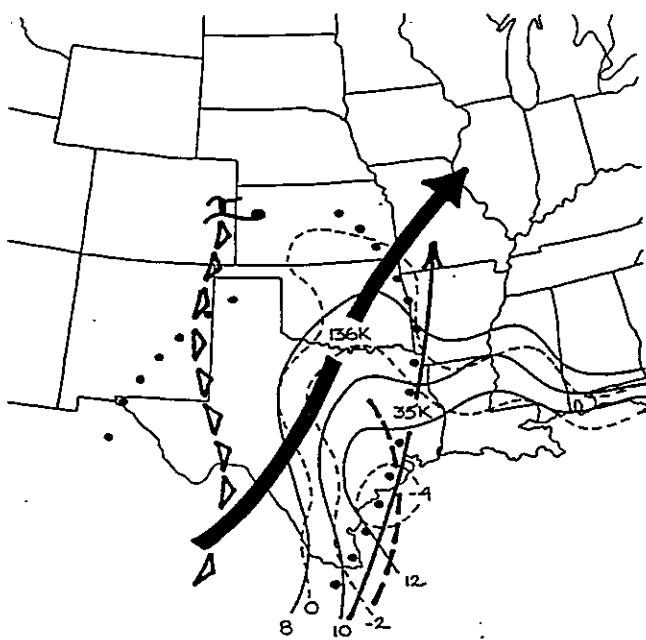
15FEB87 0625-1645 CST 40 REPORTS 11 TORNADOES

Composite 6AM CST February 15, 1987

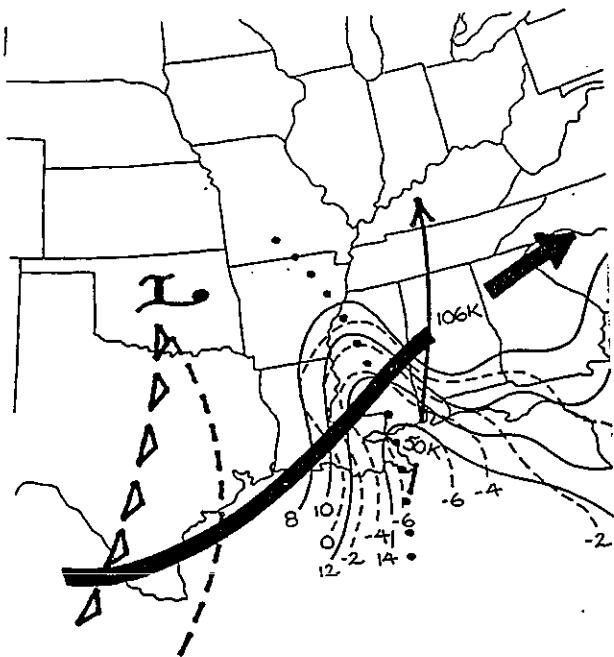


500 MB 6AM CST February 15, 1987



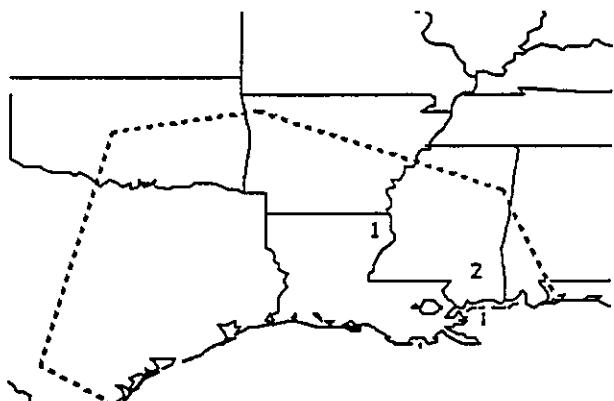


Composite 6PM CST February 27, 1987

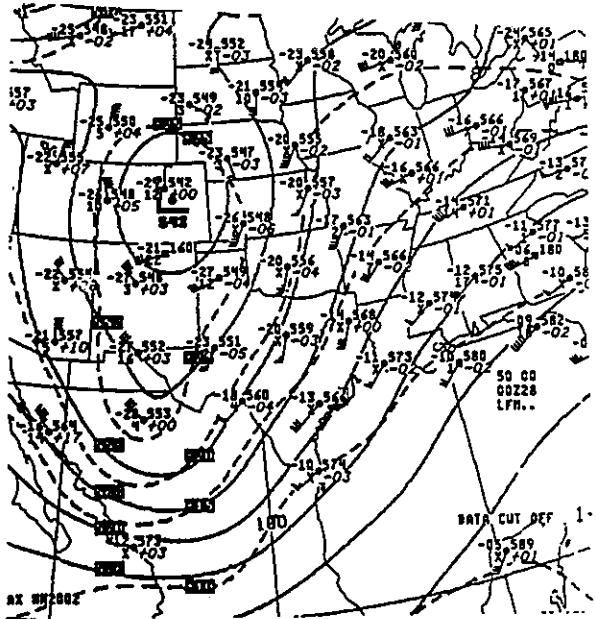


Composite 6AM CST February 28, 1987

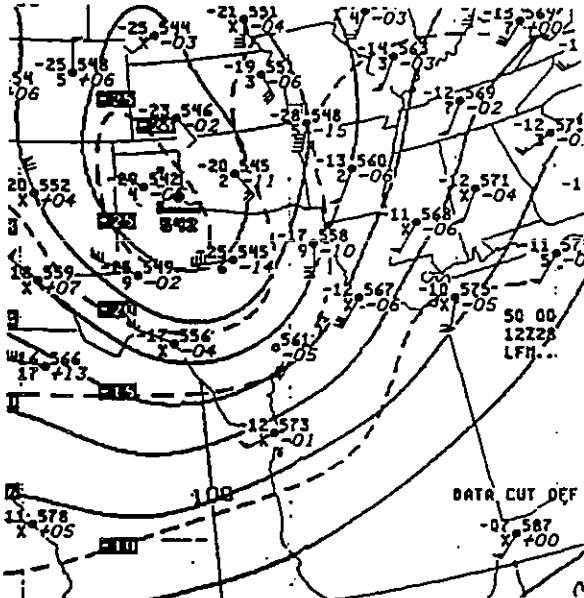
NO	TIME	EVENT	ST	LOCATION	
1	0515	TORNADO-F2	LA	GOODHILL	2 INJURIES
2	0803	TORNADO-F4	MS	LAUREL	
				40 MILE PATH	6 DEATHS 350 INJURIES \$28.5 MILLION DAMAGE



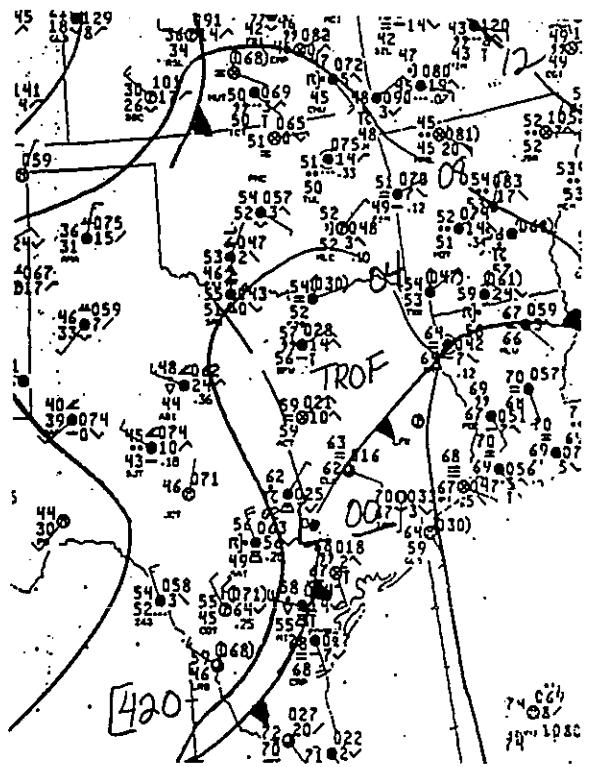
28FEB87-28FEB87 1338-0945 CST 62 REPORTS 4 TORNADOES



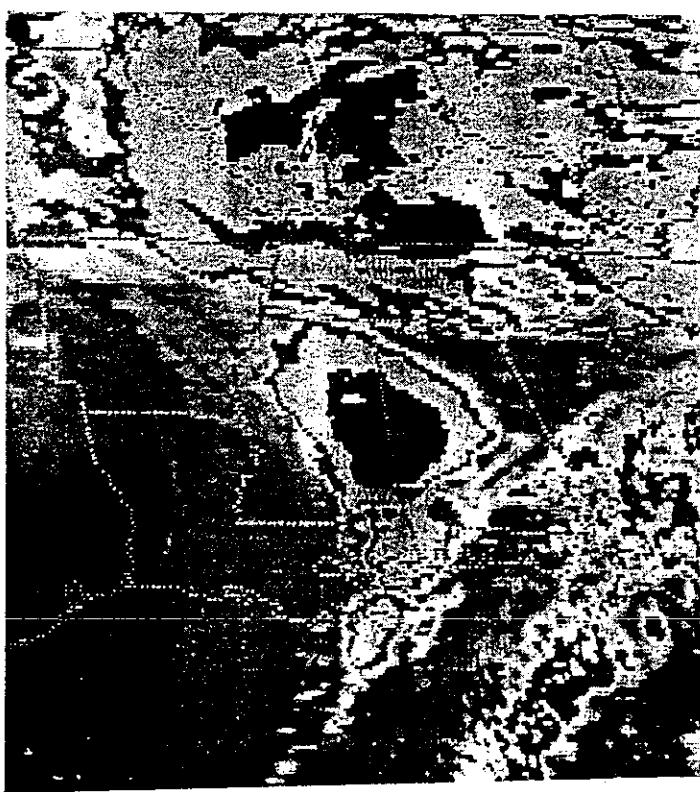
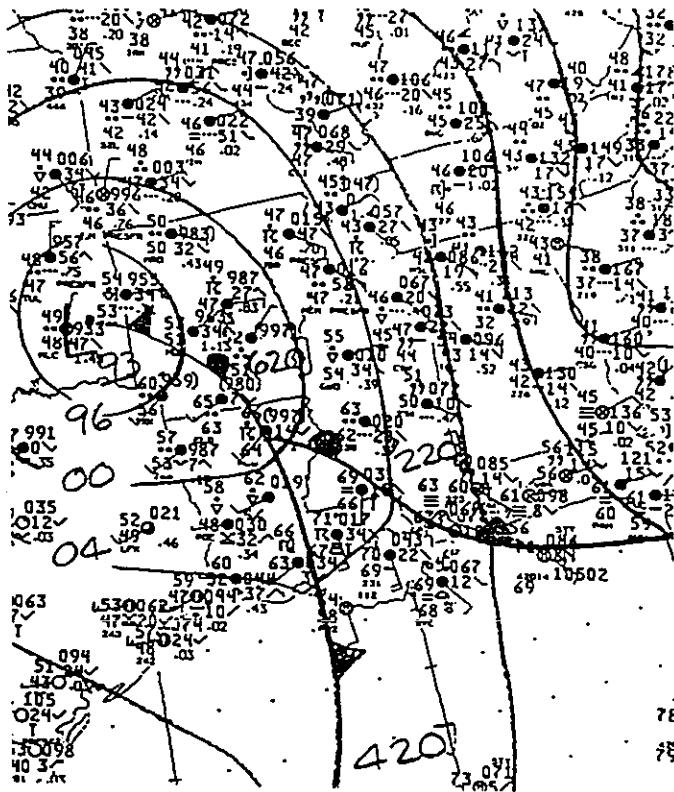
500 MB 6PM CST February 27, 1987



500 MB 6AM CST February 28, 1987

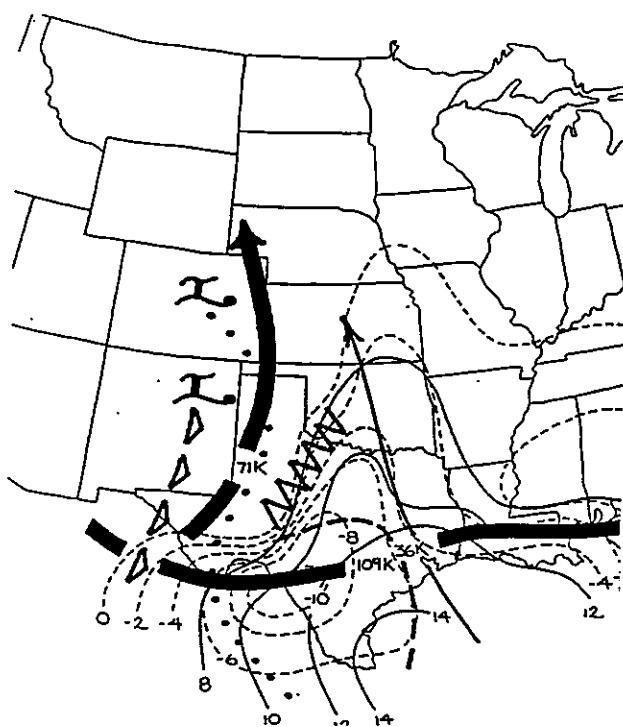


Surface 9PM CST February 27, 1987 GOES 6:30PM CST February 27, 1987

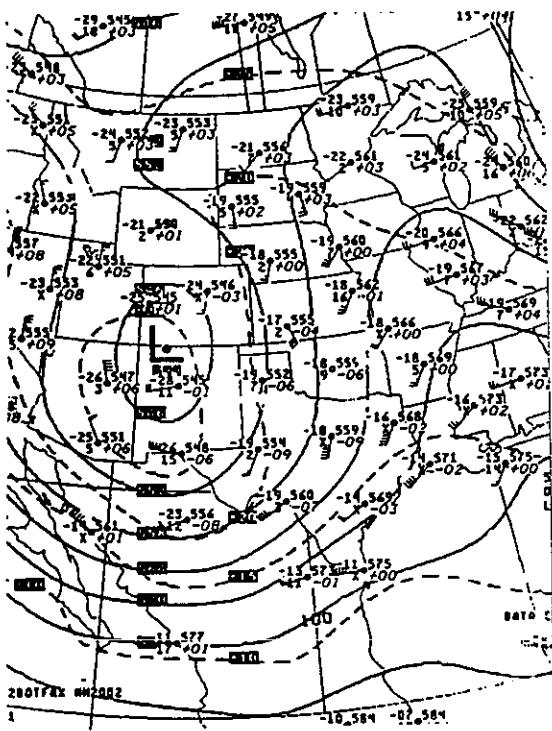


Surface 6AM CST February 28, 1987

GOES 9AM CST February 28, 1987



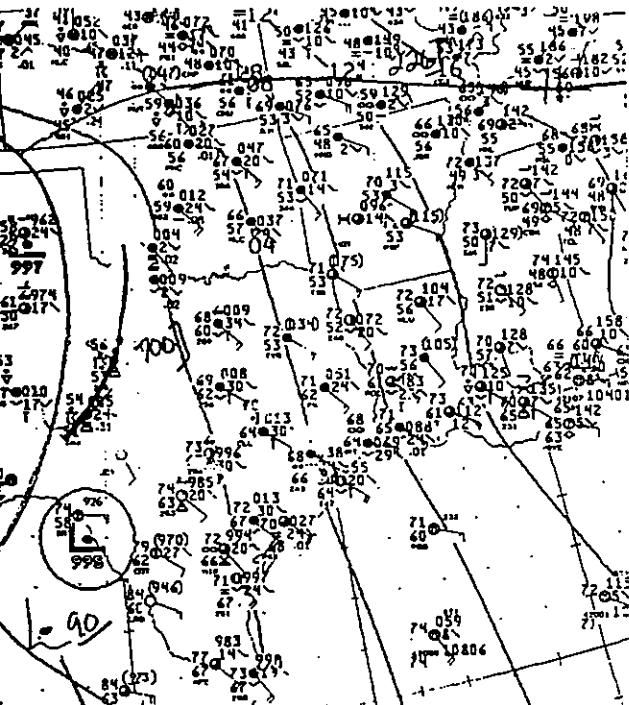
Composite 6PM CST March 16, 1987



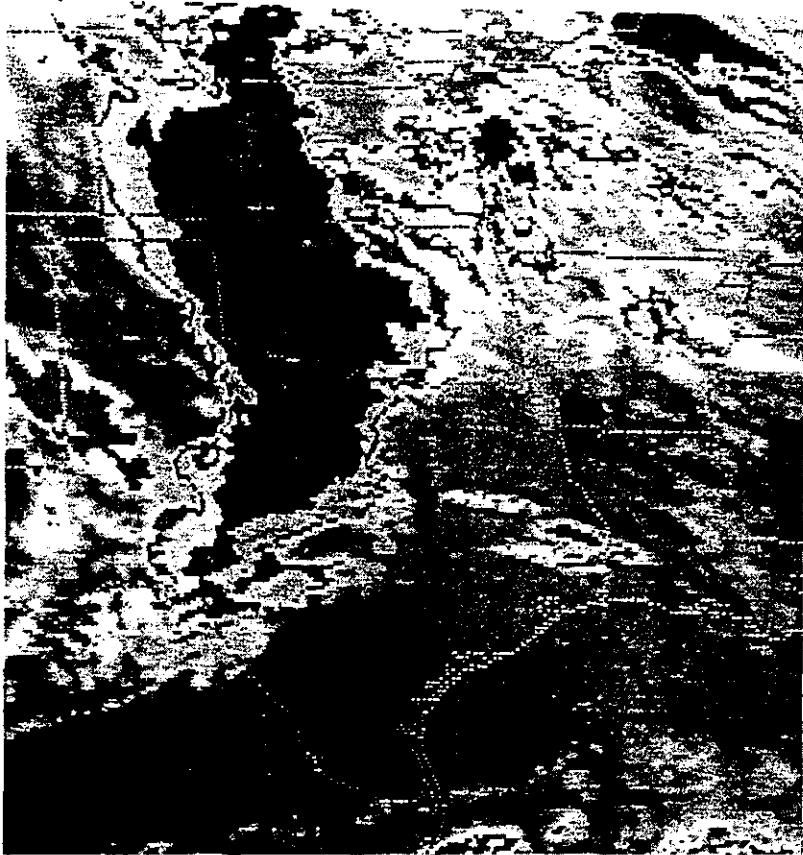
500 MB 6PM CST March 16, 1987

NO	TIME	EVENT	ST	LOCATION
1	1803	4.50 INCH HAIL	TX	DEL RIO
2	0320	DEATHS 7 INJURED 93 MILLION DAMAGE		
2	0320	TORNADO-F1	TX	SLOCUM
		3 DEATHS 4 INJURED		

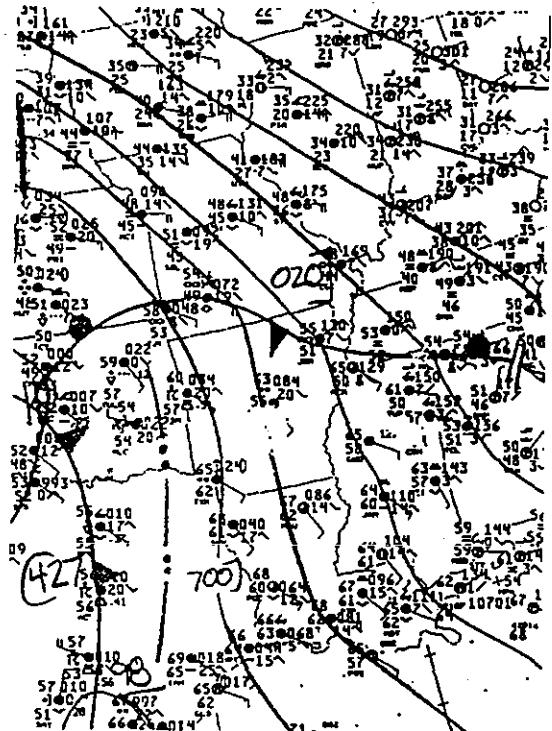
16MAR87-17MAR87 1340-0700 CST 56 REPORTS 5 TORNADOES



Surface 6PM CST March 16, 1987

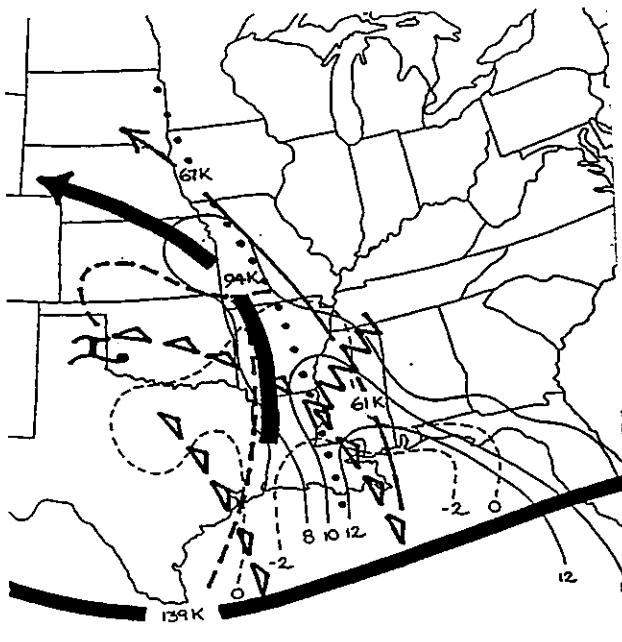


GOES 6PM CST March 16, 1987

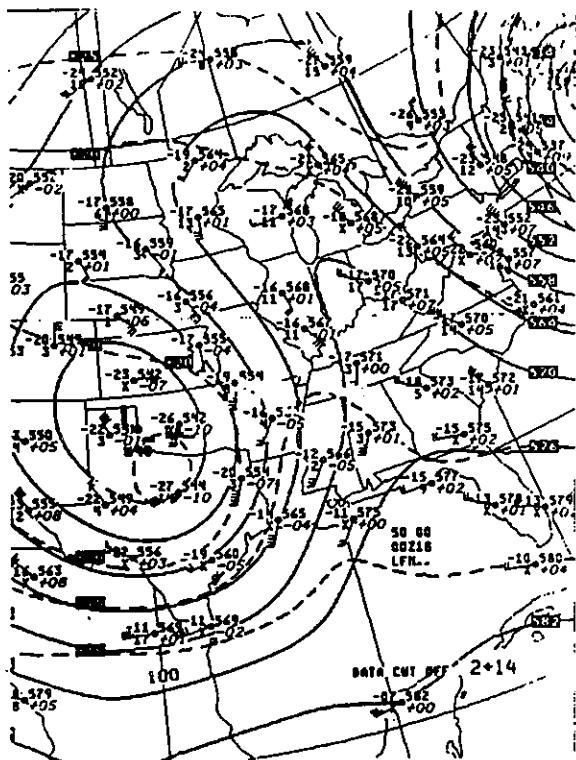


Surface 3AM March 17, 1987



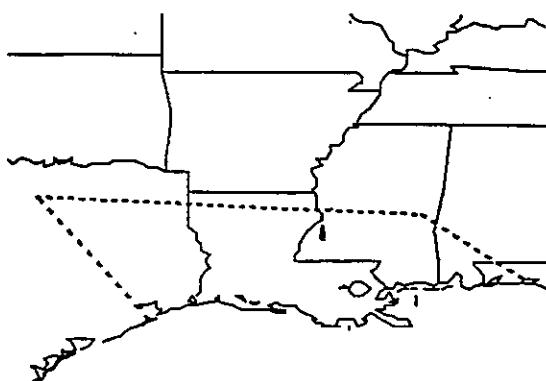


Composite 6PM CST March 17, 1987

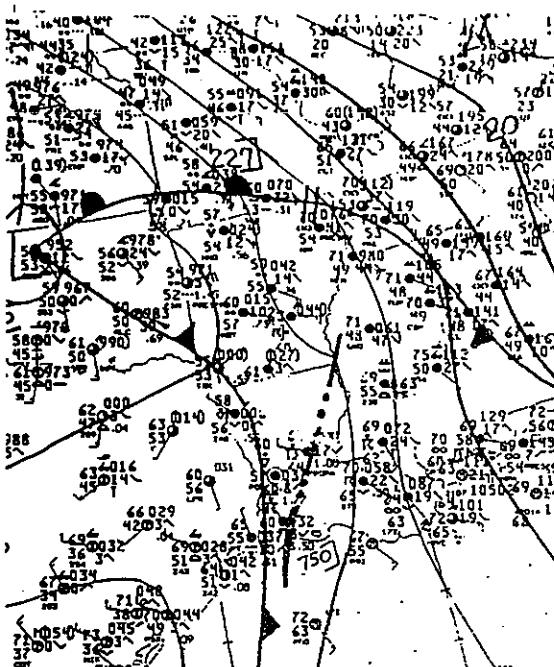


500 MB 6PM CST March 17, 1987

NO TIME EVENT ST LOCATION
1 1730 TORNADO-F1 MS NATCHZ 4 INJURED \$3 MILLION DAMAGE

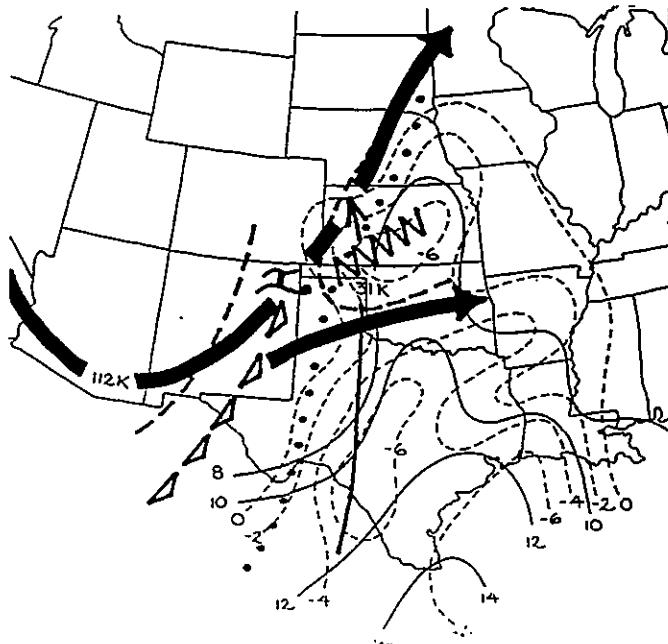


17MAR87 0815-2345 CST 32 REPORTS 8 TORNADOES

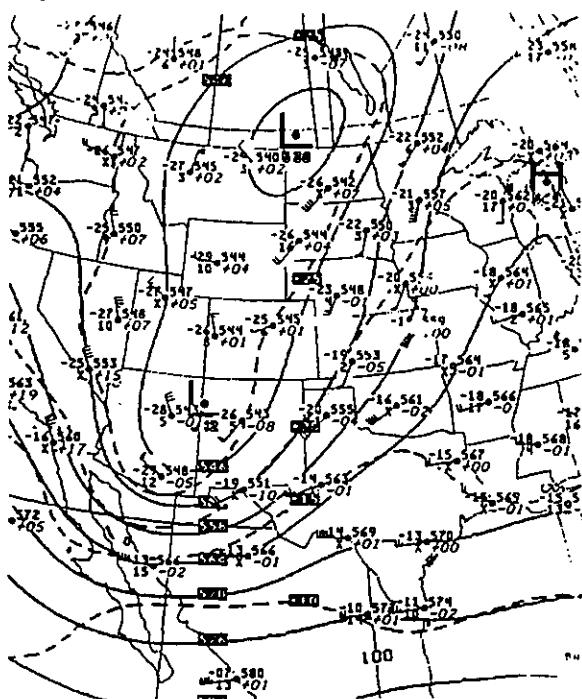


Surface 12 NOON CST March 17, 1987





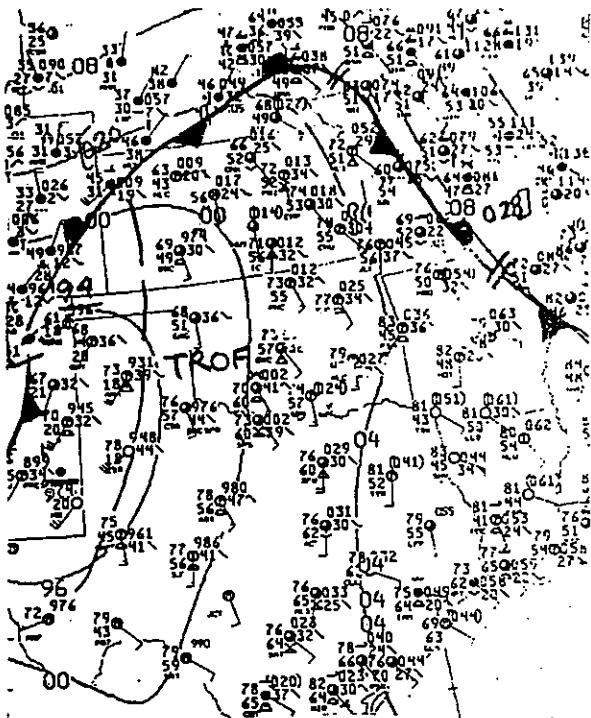
Composite 6PM CST March 22, 1987



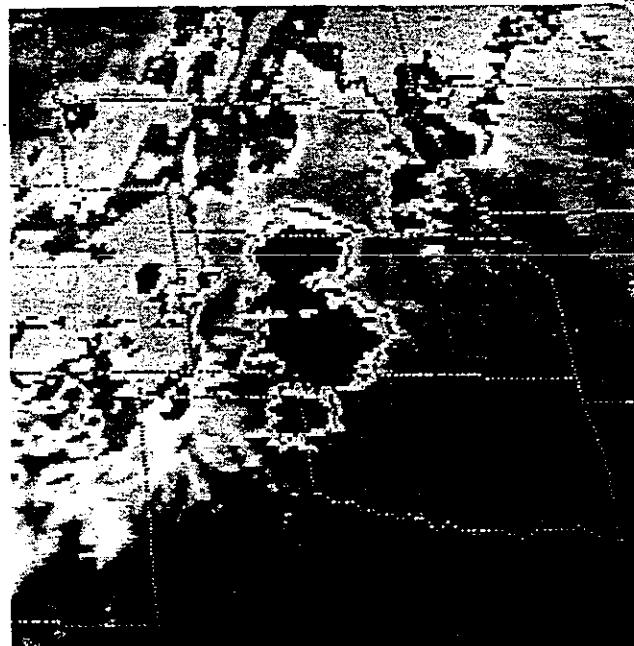
500 MB 6PM CST March 22, 1987

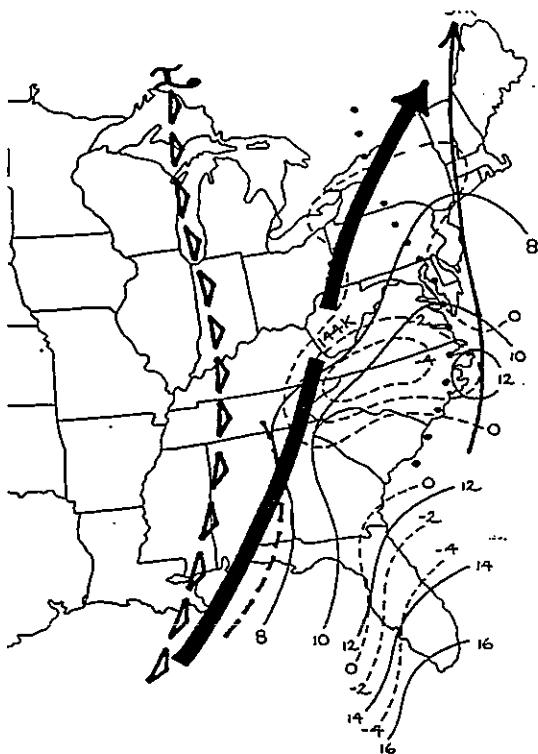
NO	TIME	EVENT	ST	LOCATION	30 MILE PATH
1	1743	TORNADO-F3	TX	LIPSCOMB	
2	1845	TORNADO-F2	OK	CATEGORY	
3	1900	TORNADO-F2	OK	LEVERNE	
4	1932	TORNADO-F2	OK	ELMWOOD	6 INJURIES

22MAR87-23MAR87 1705-0805 CST 83 REPORTS 11 TORNADOES

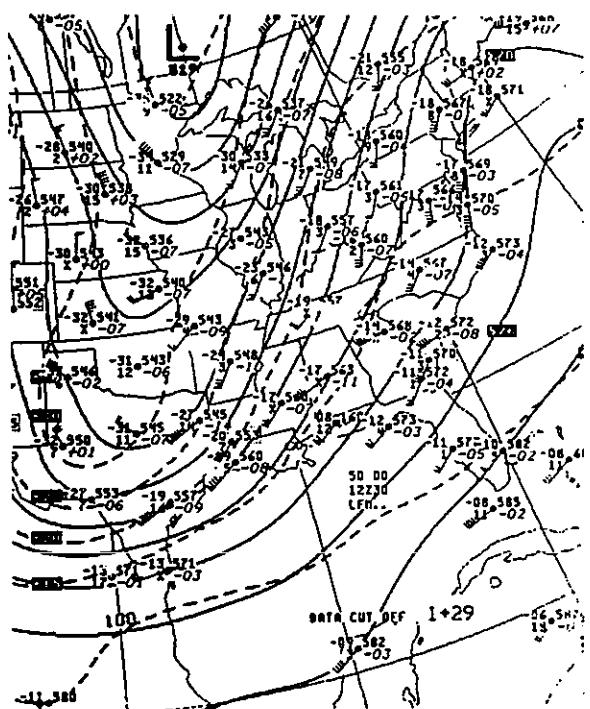


Surface 3PM CST March 22, 1987



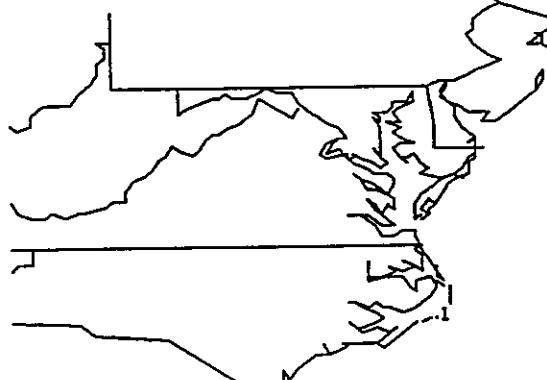


Composite 6PM CST March 30, 1987

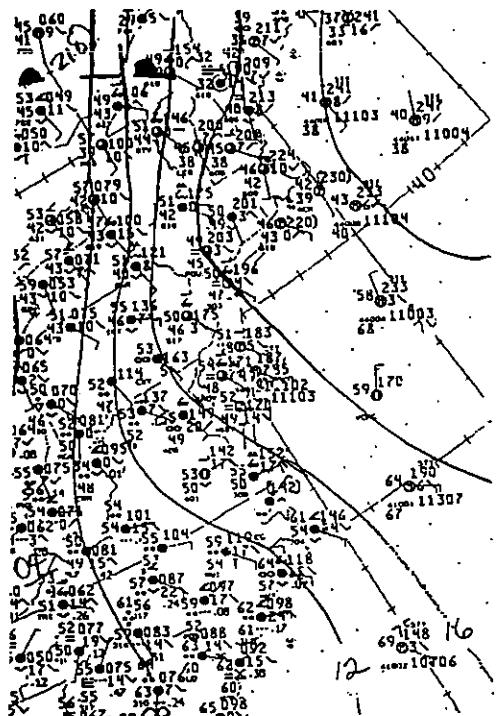


500MB 6AM CST March 30, 1987

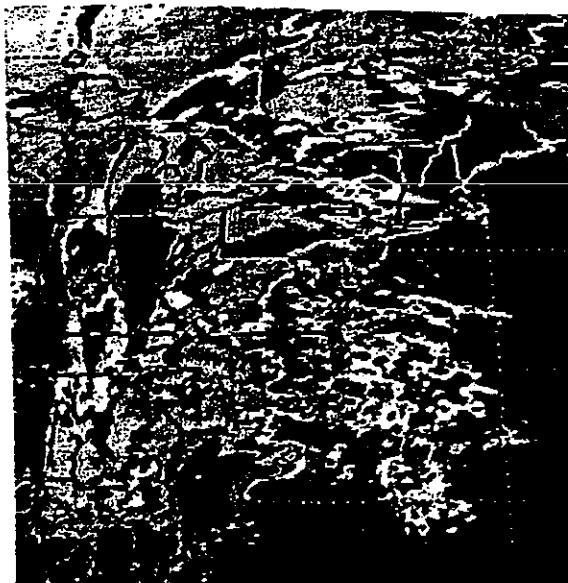
NO	TIME	EVENT	ST	LOCATION	
1	0532	TORNADO-F2	NC	BUXTON	7 INJURED \$1 MILLION DAMAGE

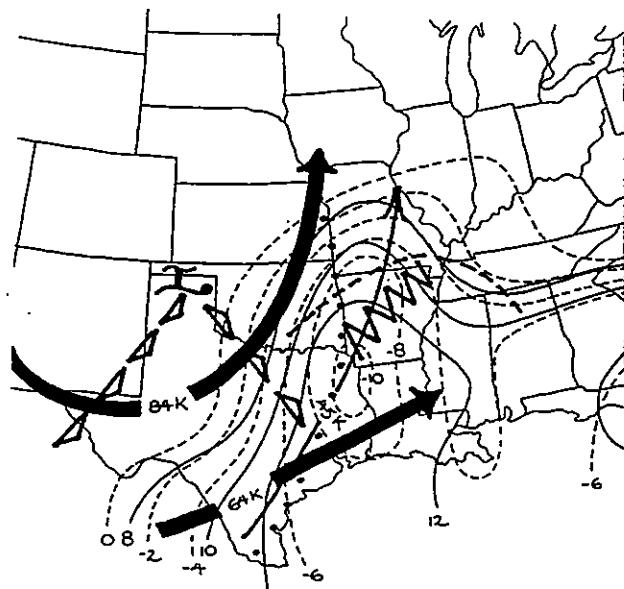


CAPE HATTERAS WATERSPOUT MARCH 30 1987

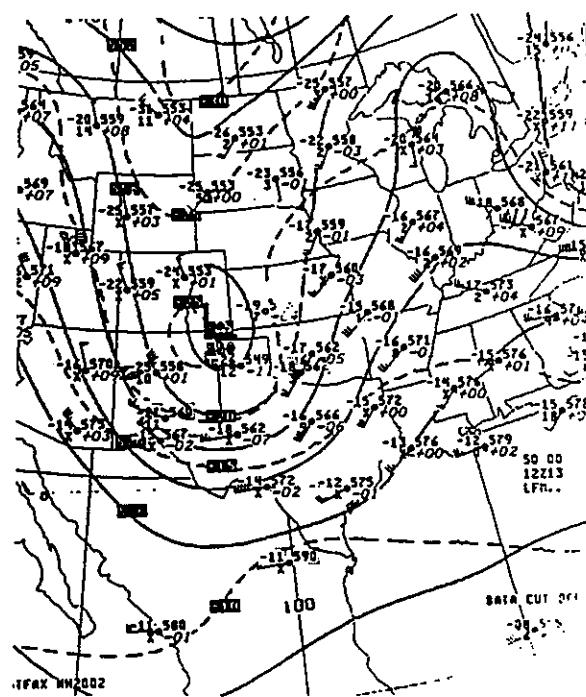


Surface 6AM CST March 30, 1987



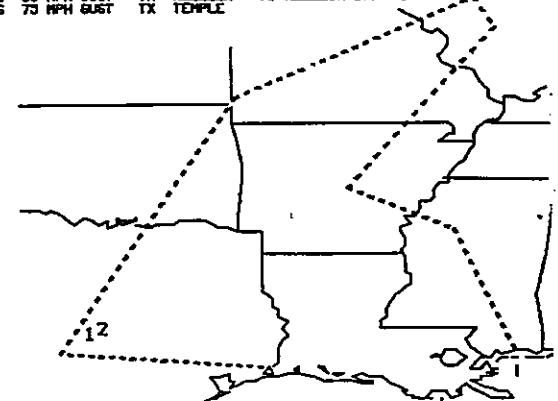


Composite 6AM CST April 13, 1987

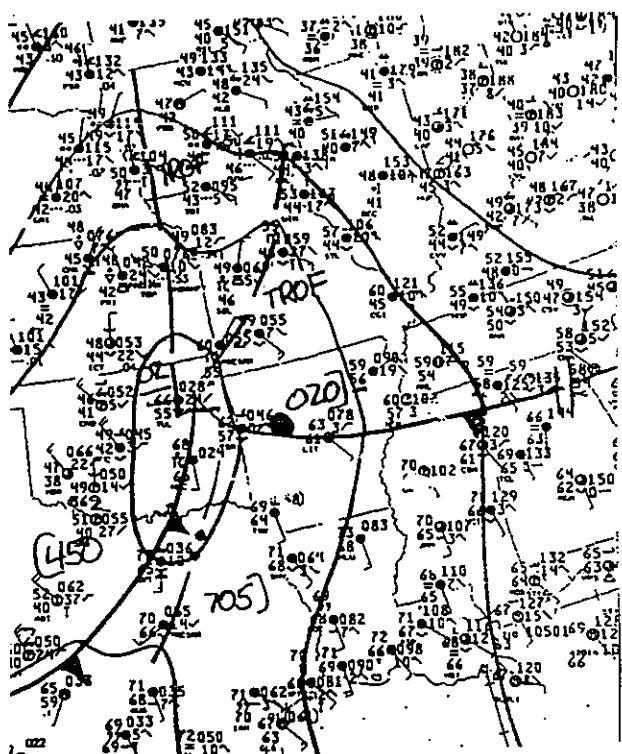


500MB 6AM CST April 13, 1987

NO	TIME	EVENT	ST	LOCATION
1	0613	88 MPH GUST	TX	KILLEEN
2	0636	73 MPH GUST	TX	TEMPLE
				*1 MILLION DRAINS

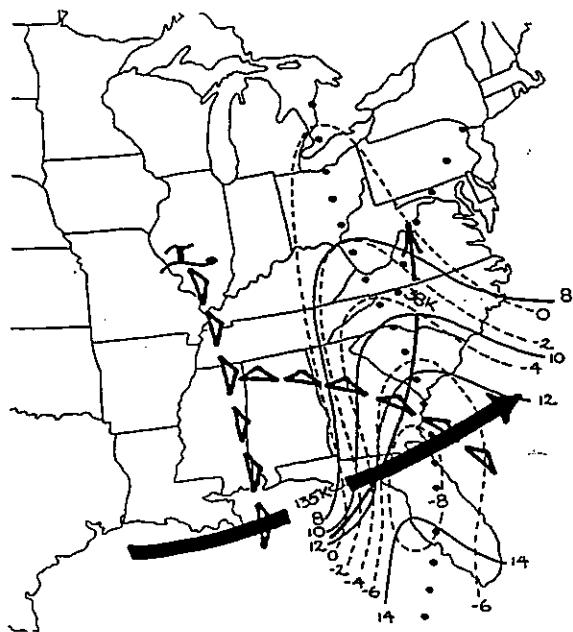


13APR87 0430-2248 CST 86 REPORTS 3 TORNADOES

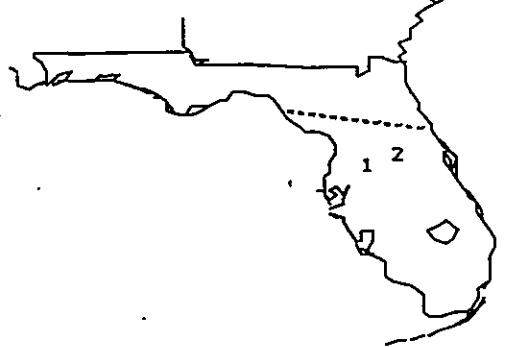


Surface 3AM CST April 13, 1987



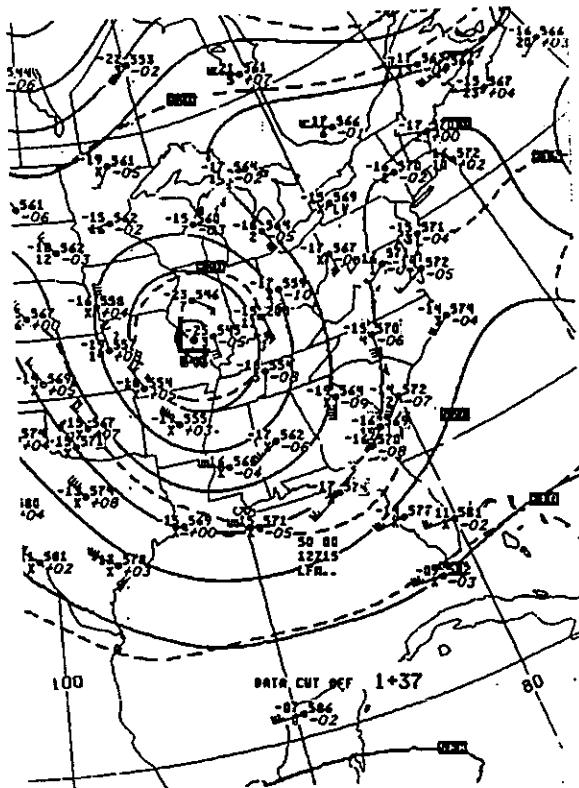


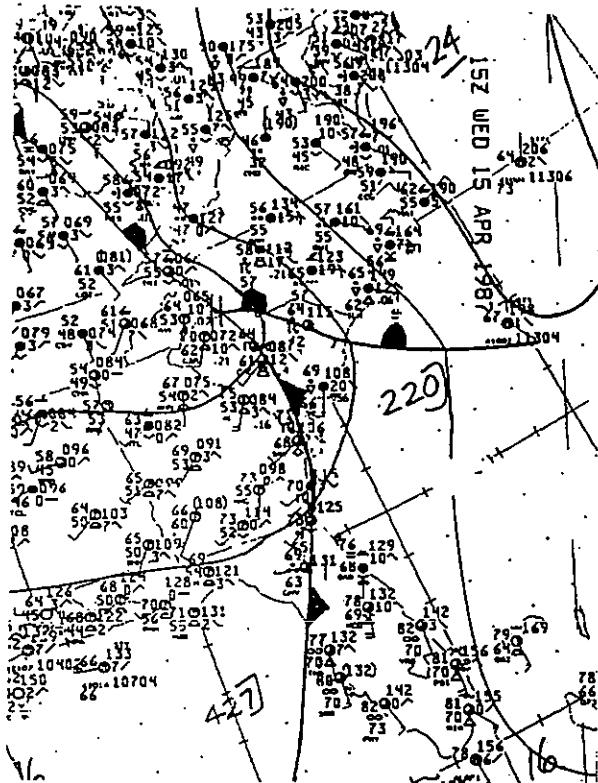
NO	TIME	EVENT	ST	LOCATION
1	0820	TORNADO-F2	FL	BEVILLE'S CORNER
2	0813	TORNADO-F2	FL	MOUNT DORA
				ONE DEATH 7 INJURIES



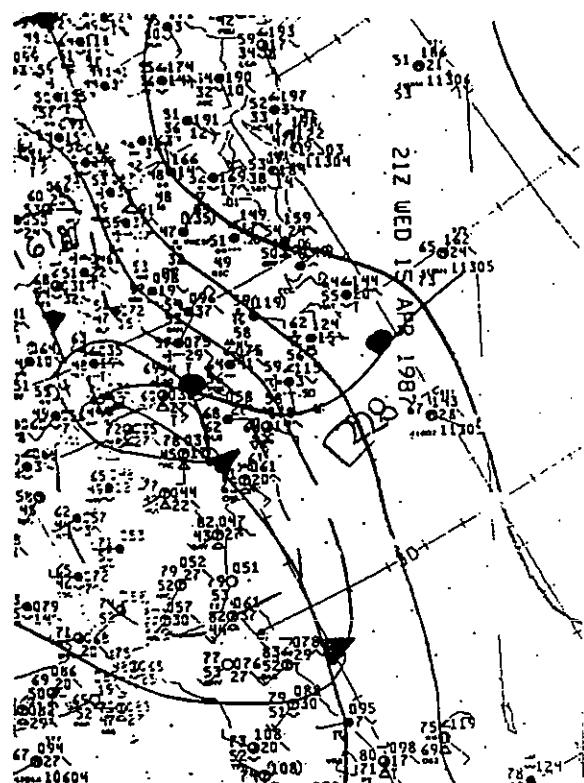
15APR87 0820-1510 CST 6 REPORTS 2 TORNADOES

Composite 6AM CST April 15, 1987

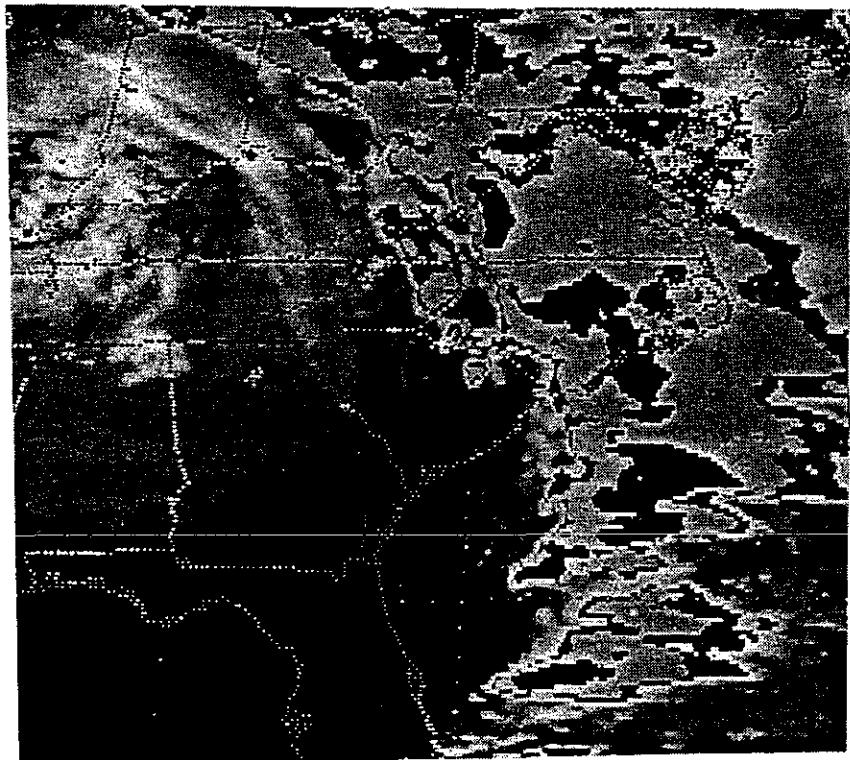




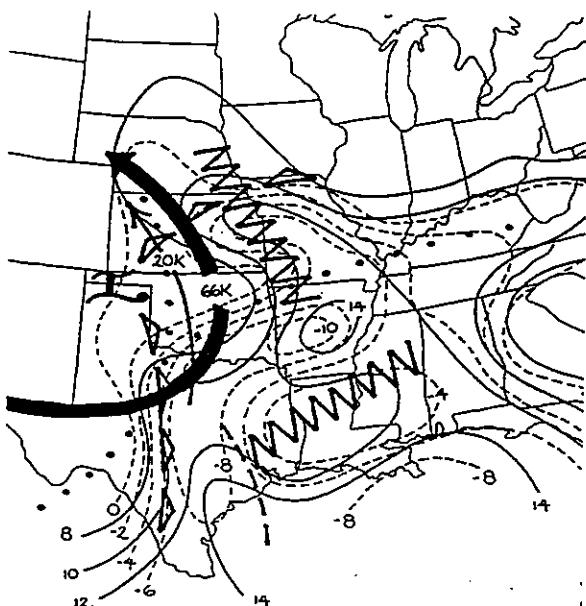
Surface 9AM CST April 15, 1987



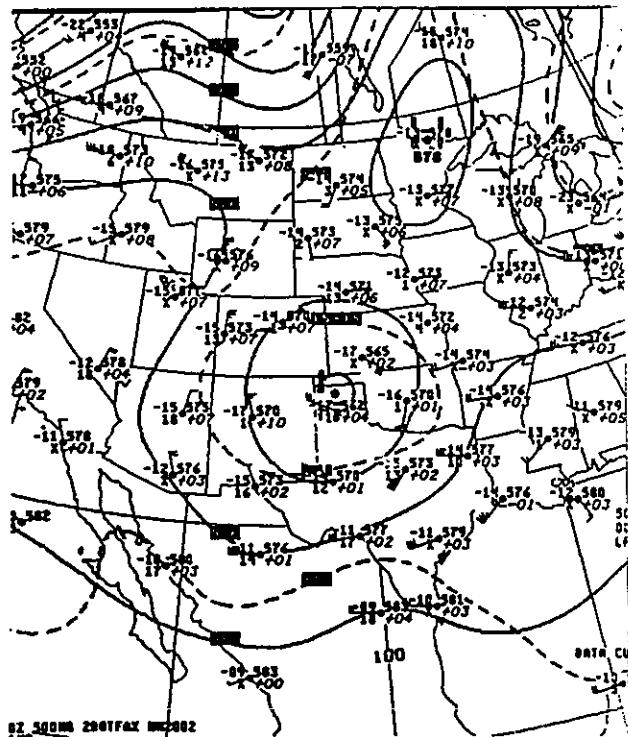
Surface 3PM CST April 15, 1987



GOES 3PM CST April 15, 1987

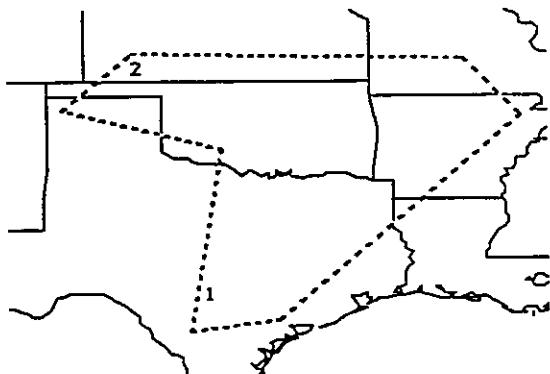


Composite 6PM CST May 3 1987

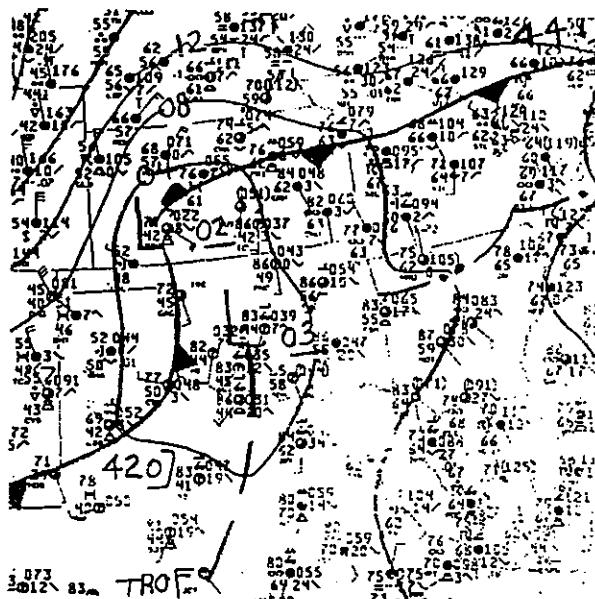


500MB 6PM CST May 3, 1987

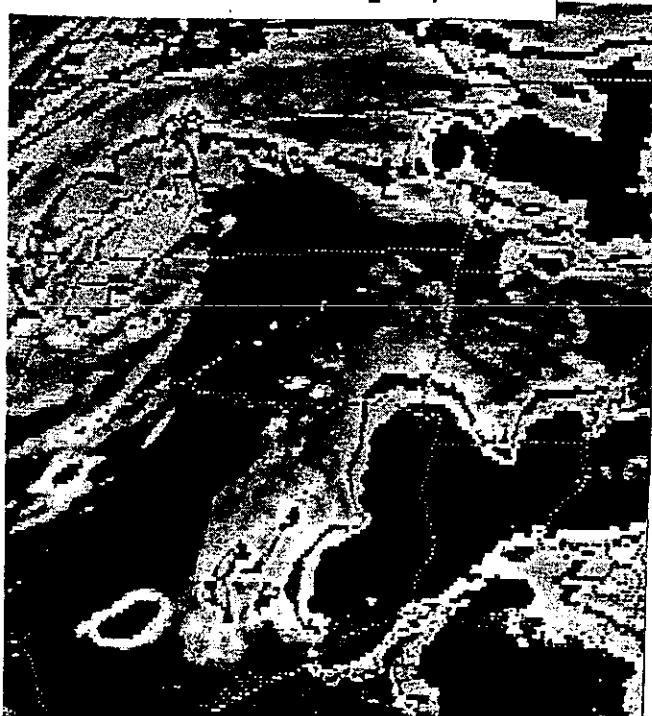
NO	TIME	EVENT	ST	LOCATION	
1	1210	4.5 INCH HAIL	TX	KERRVILLE	
2	1313	F-2 TORNADO	KS	BATANTA	#3 MILLION DAMAGE



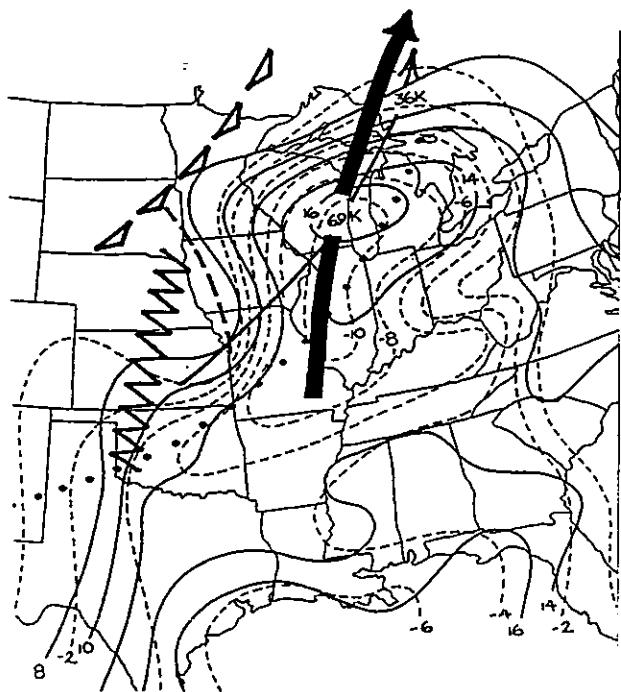
03MAY87 0215-2345 CST 90 REPORTS 4 TORNADOES



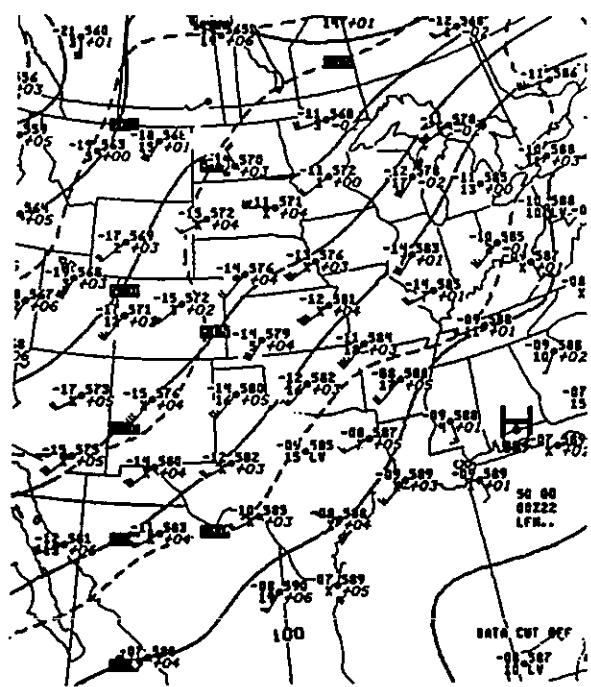
Surface 3PM CST May 3, 1987



GOES 4PM CST May 3, 1987

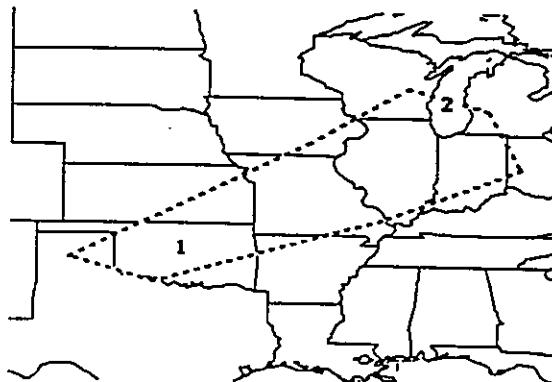


Composite 6PM CST May 21, 1987

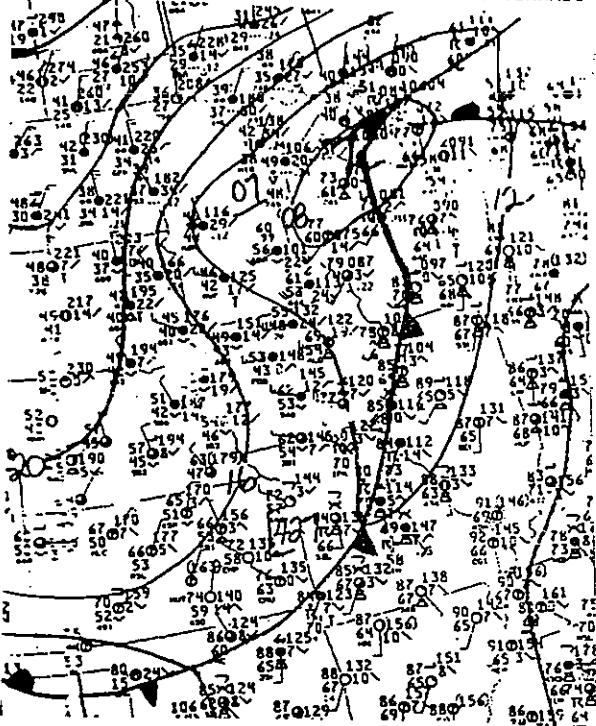


500MB 6PM CST May 21, 1987

NO	TIME	EVENT	ST	LOCATION
1	1900	2.73 INCH HAIL	OK	10 S CRESSENT
2	2100	100 MPH WIND GUST	MI	44 MM HURKEON /LAKE MICHIGAN/

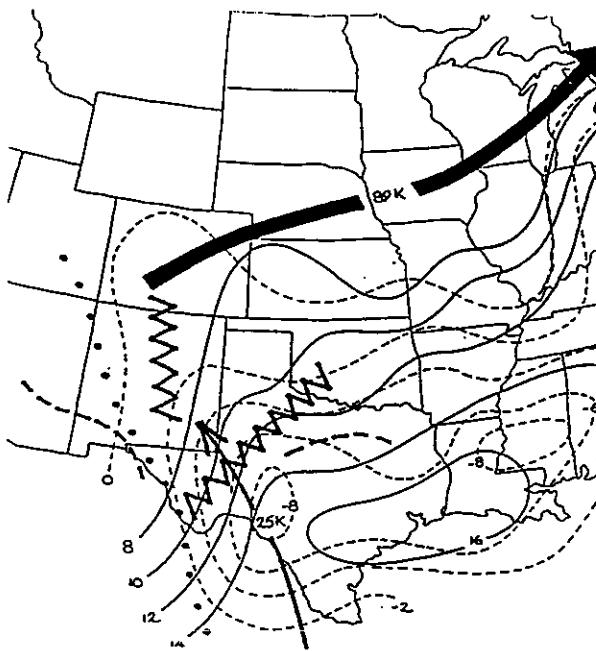


21MAY87 1030-2300 CST 145 REPORTS 1 TORNADO

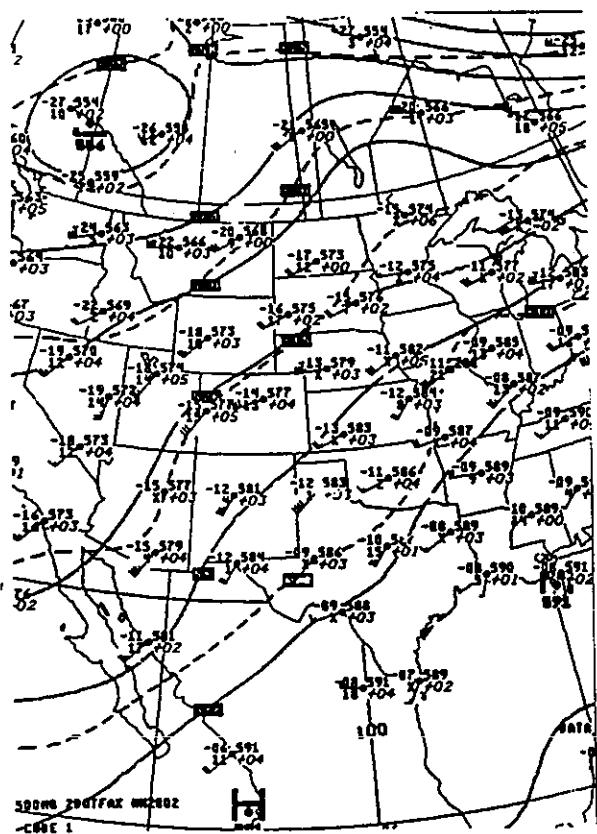


Surface 6PM CST May 21, 1987



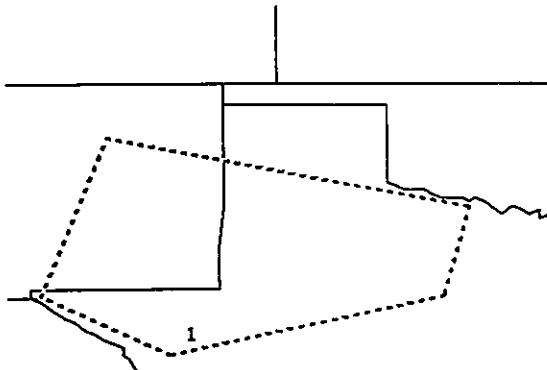


Composite 6PM CST May 22, 1987

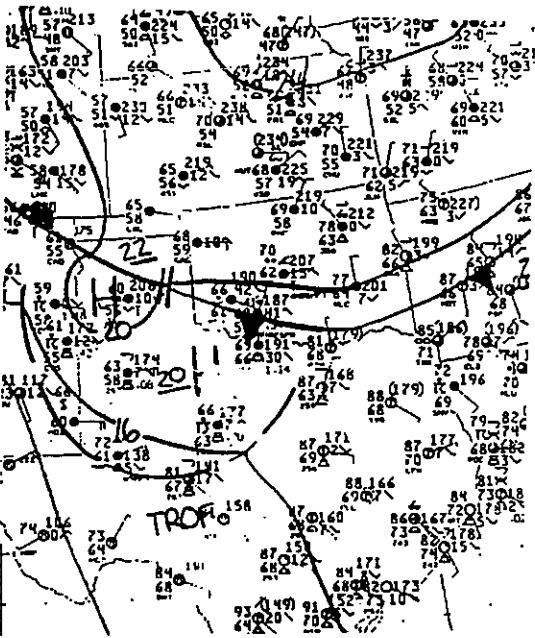


500MB 6PM CST May 22, 1987

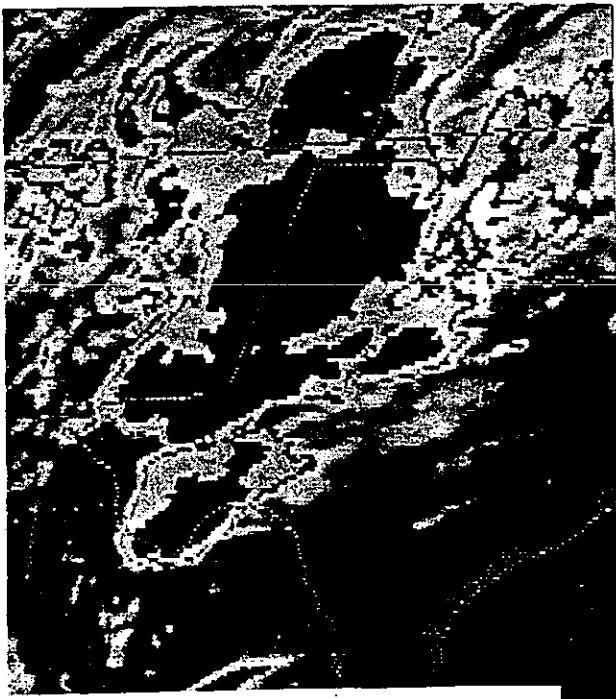
NO	TIME	EVENT	ST	LOCATION	KILLED	INJURED
1	1816	F-4 TORNADO	TX	SARAGUA	30 KILLED	121 INJURED

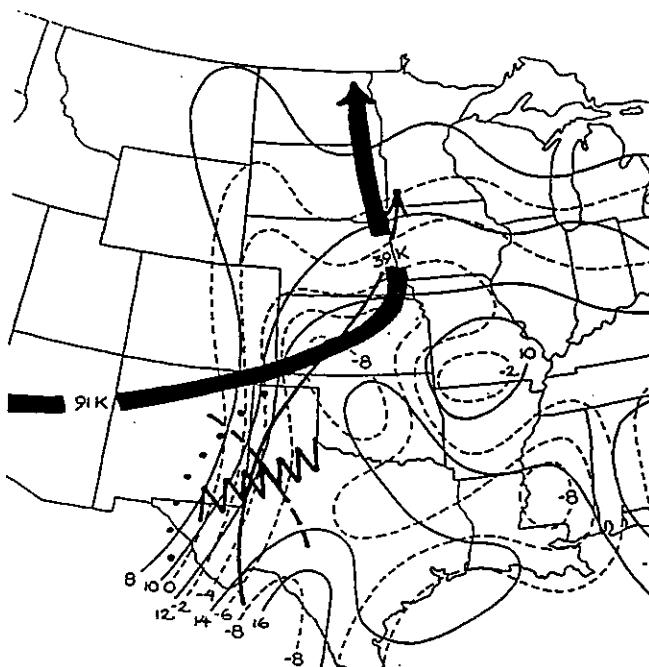


22MAY87 0920-2245 CST 17 REPORTS 4 TORNADOES

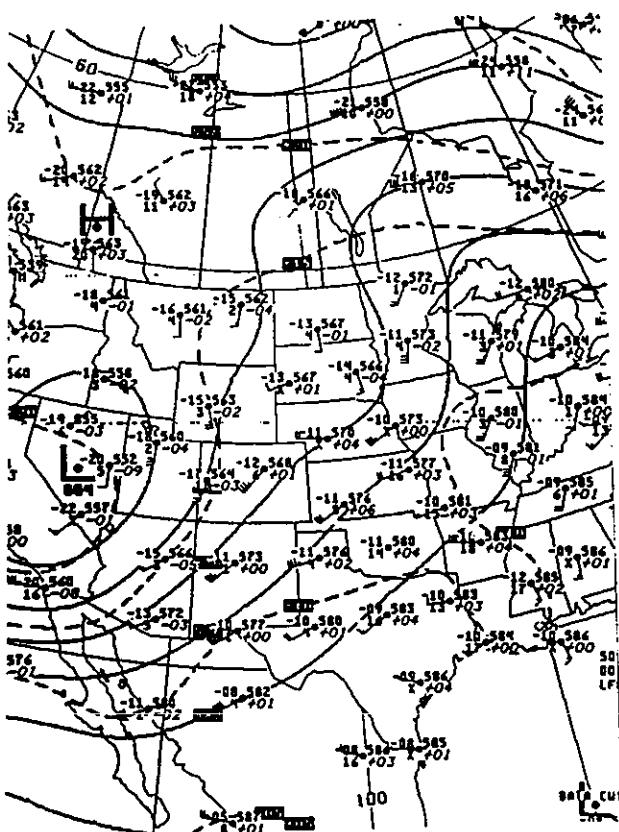


Surface 6PM CST May 22, 1987



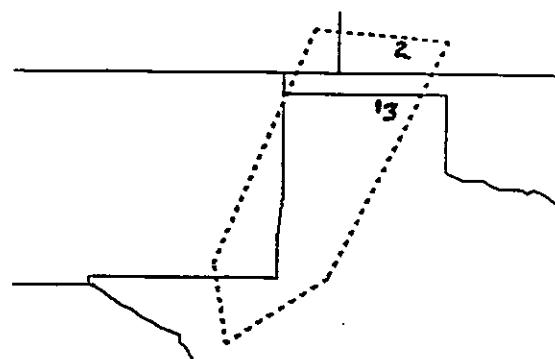


Composite 6PM CST May 25, 1987

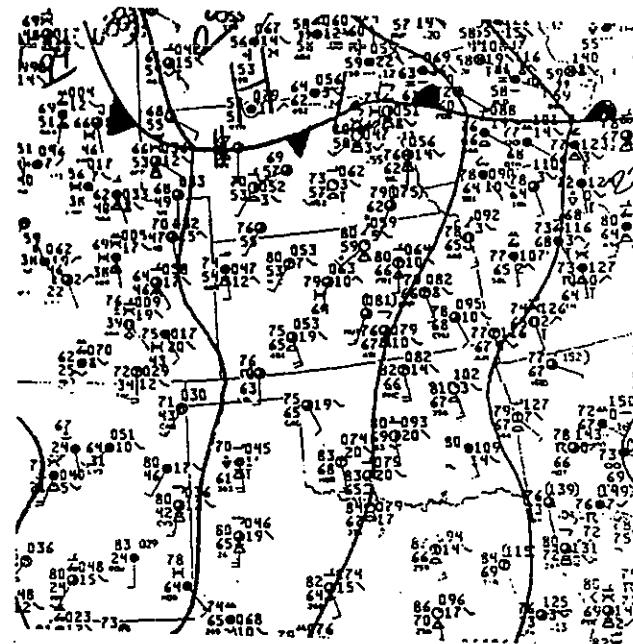


500MB 6PM CST May 25, 1987

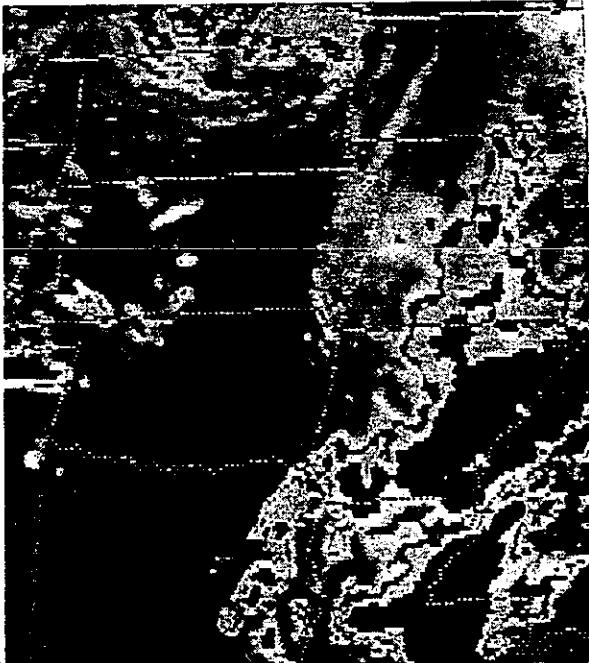
NO	TIME	EVENT	ST	LOCATION
1	1720	F-3 TORNADO	TX	GROVER
2	1823	2.0 INCH HAIL	KS	E N COPELAND
3	1812	F-3 TORNADO	TX	WACO

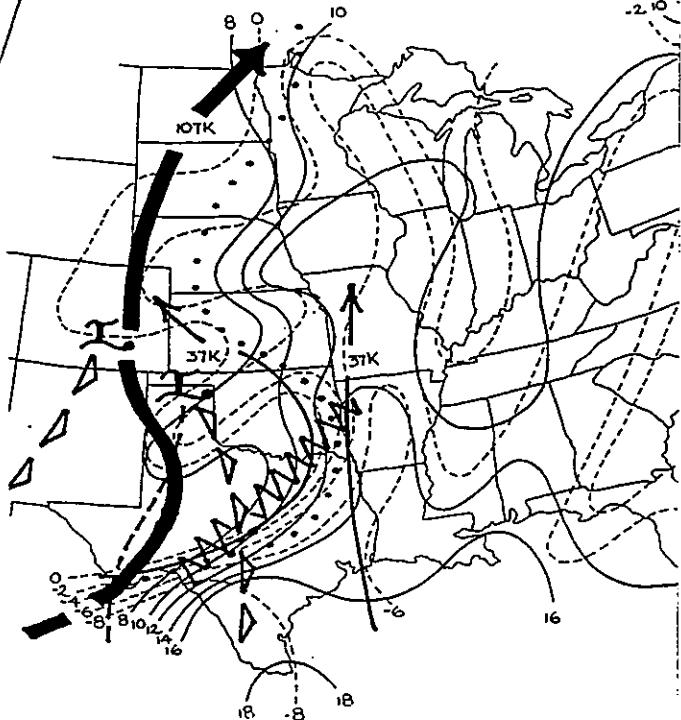


25MAY87 1103-2331 CST 38 REPORTS 18 TORNADOES

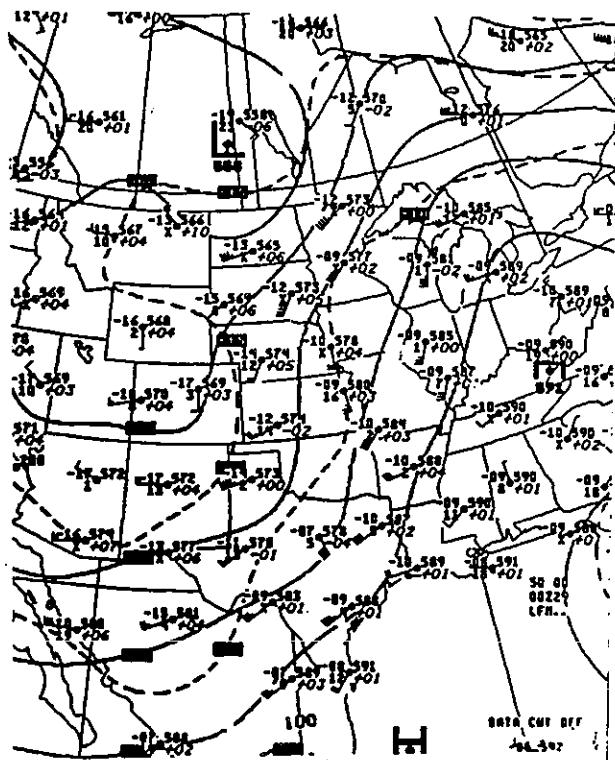


Surface 6PM CST May 25, 1987



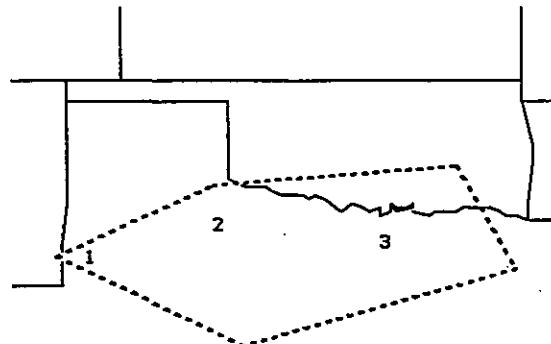


Composite 6PM CST May 28, 1987

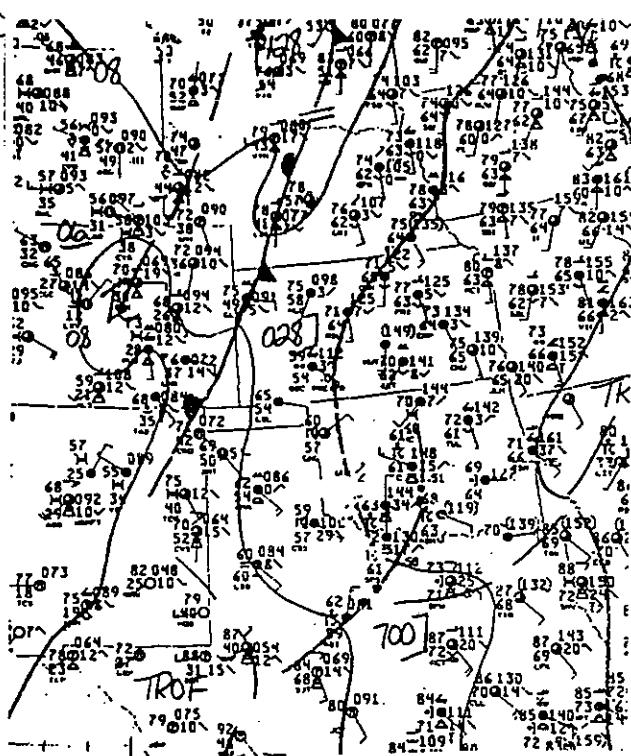


500MB 6PM CST May 28, 1987

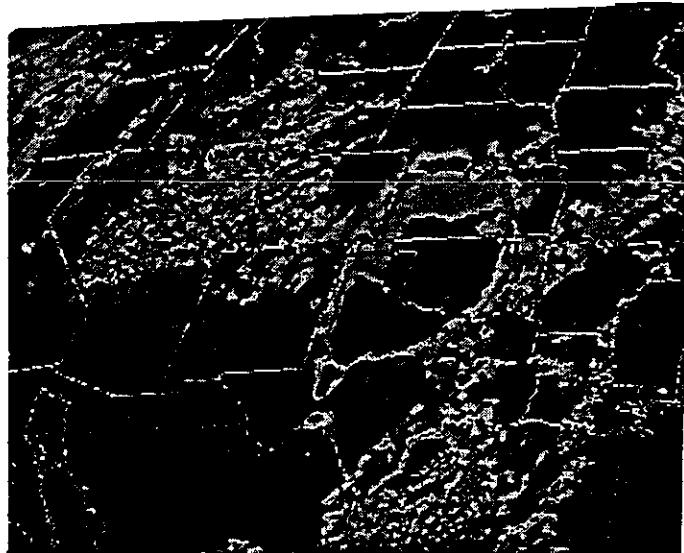
NO	TIME	EVENT	ST	LOCATION
1	0403	2.75 INCH HAIL	TX	SEMINOLE
2	0810	F-2 TORNADO	TX	GUTHRIE
3	1630	75 MPH WIND GUST	TX	DENTON



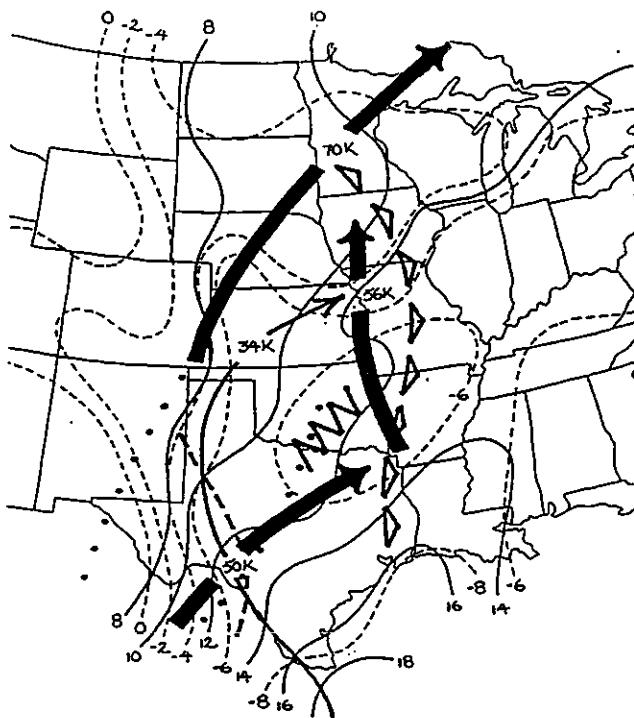
28MAY87 0405-2038 CST 33 REPORTS 5 TORNADOS



Surface 3PM CST May 28, 1987

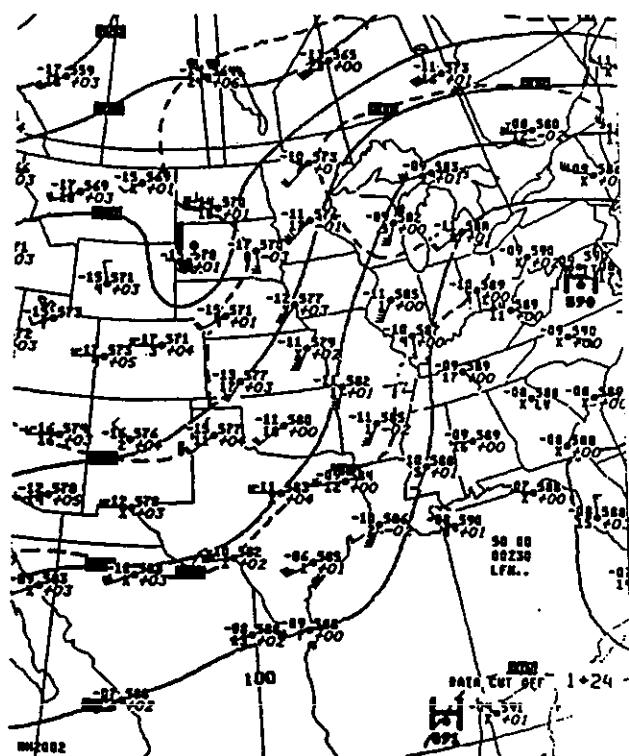


No. 50 May 29 1987



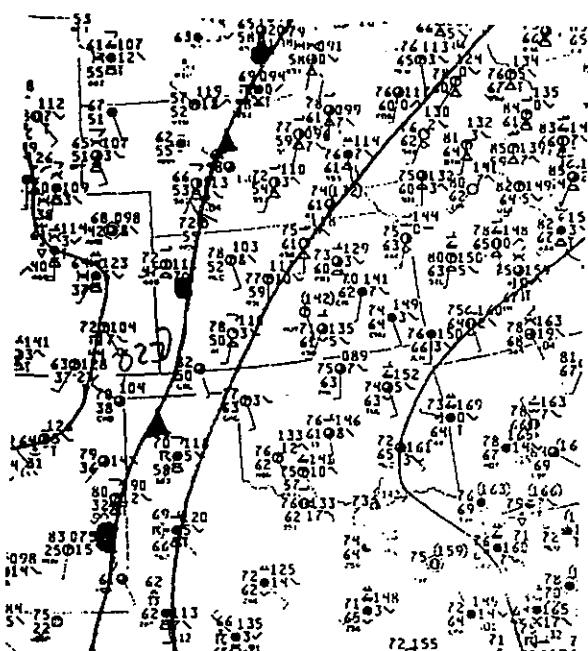
NO	TIME	EVENT	ST	LOCATION	
1	1710	4.5 INCH HAIL	TX	LAMESA	
2	1720	F-2 TORNADO	TX	WOLFFORTH	3 INJURED

Composite 6AM CST May 30, 1987



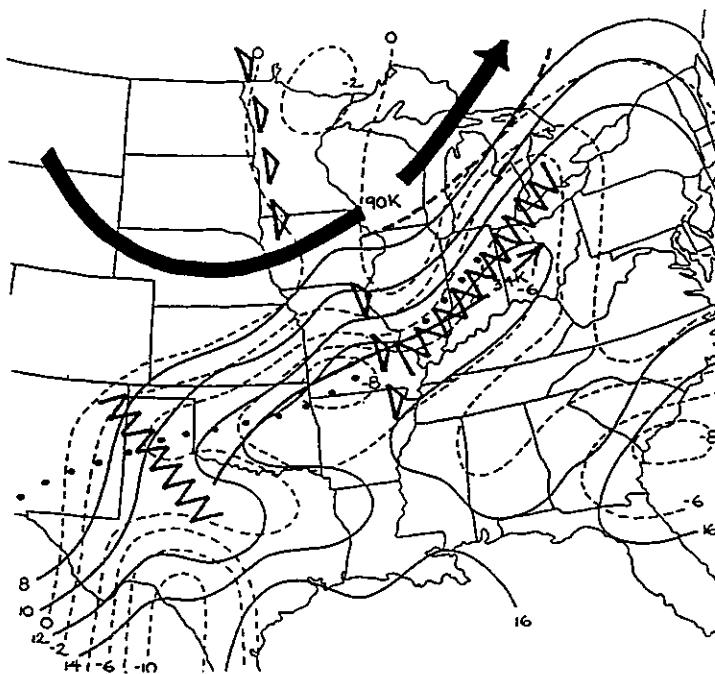
500MB 6PM CST May 29, 1987

29MAY87 1620-2230 CST 17 REPORTS 8 TORNADOES

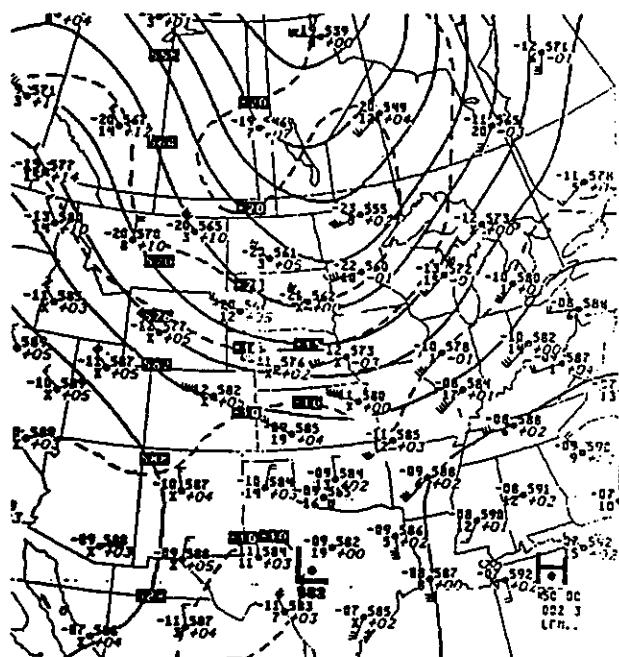


Surface 6PM CST May 29, 1987



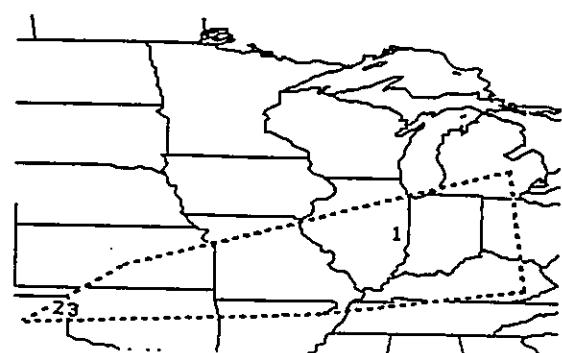


Composite 6PM CST June 2, 1987

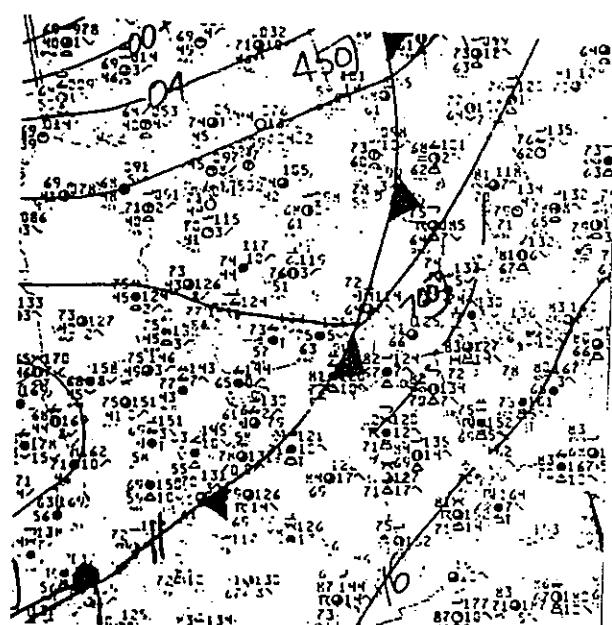


500MB 6PM CST June 2, 1987

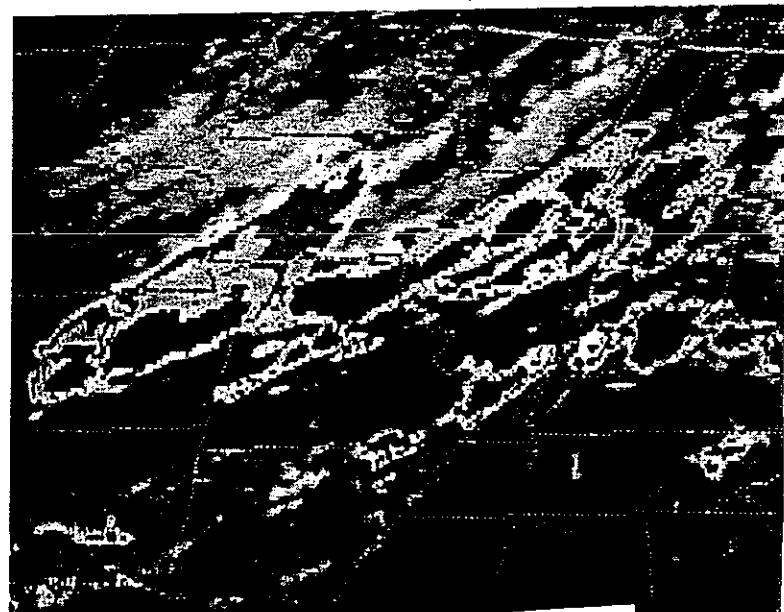
NO	TIME	EVENT	ST	LOCATION
1	1312	TORNADO-FZ	IL	ST JOSEPH
2	1420	TORNADO-FZ	TX	DARROWZETT
3	1515	TORNADO-FZ	TX	LIPSCOMB



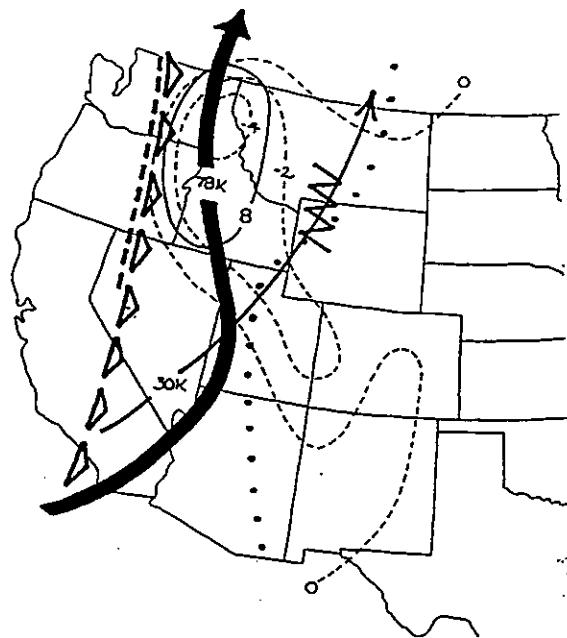
02JUN87 1009-2245 CST 111 REPORTS 14 TORNADOES



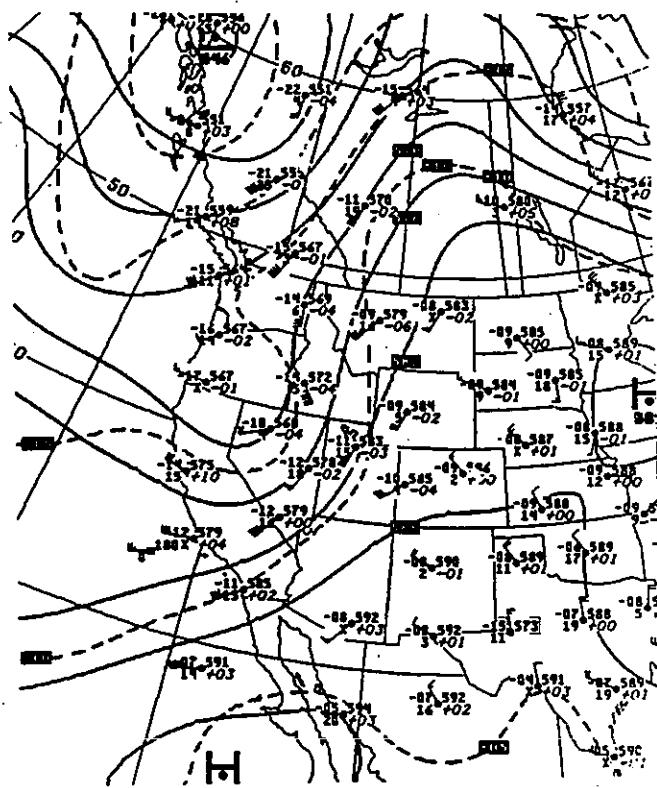
Surface 12 NOON CST June 2, 1987



GOES 1:01PM CST June 2, 1987

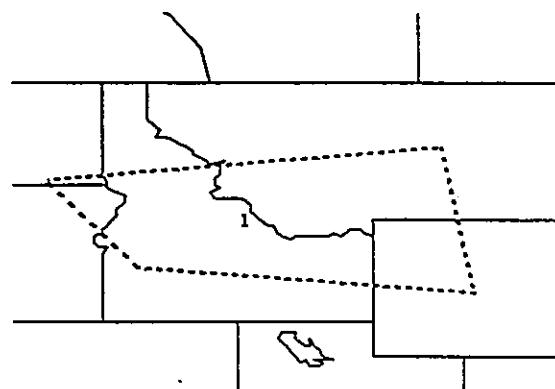


Composite 6PM CST June 15, 1987

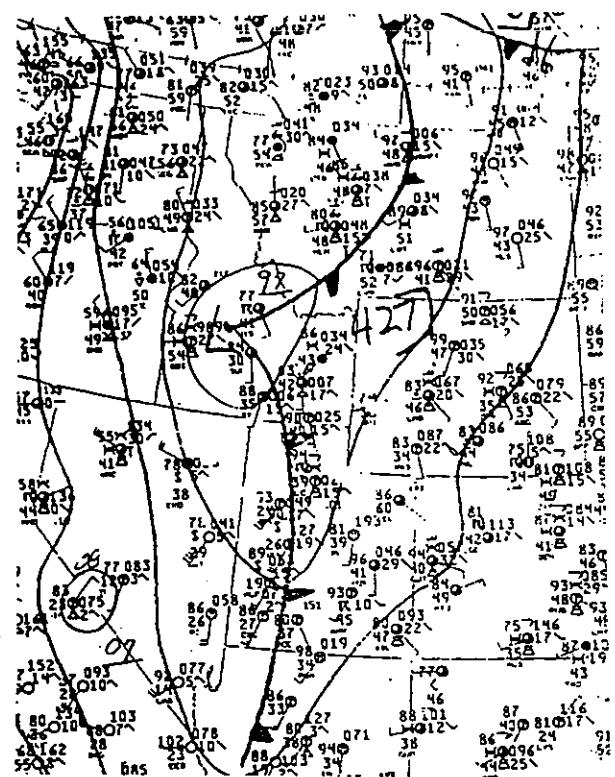


500MB 6PM CST June 15, 1987

NO TIME EVENT
1 1600 TORNADO-F1
ST LOCATION
ID SALMON

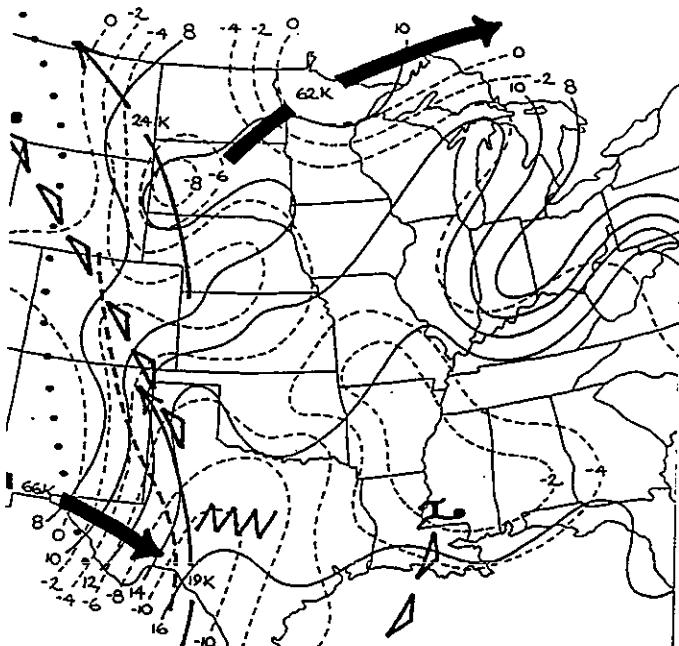


15JUN87 1500-2000 CST 22 REPORTS 1 TORNADO

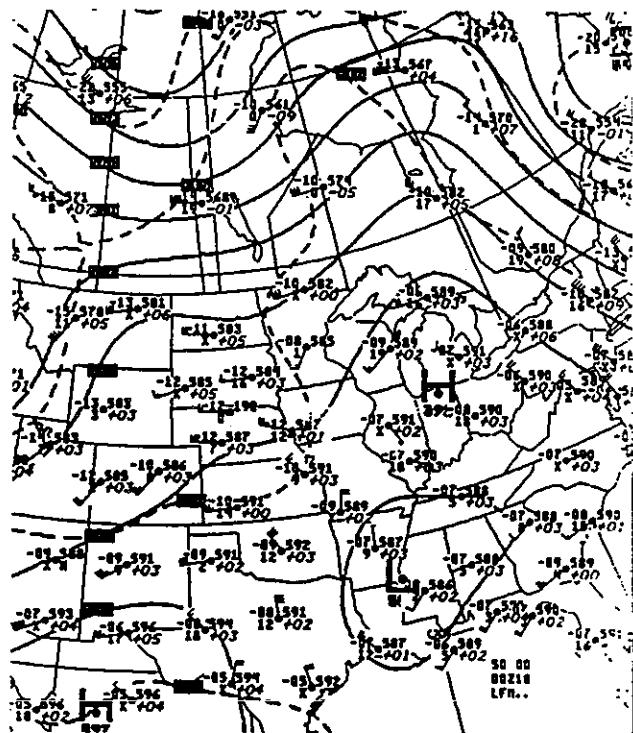


Surface 6PM CST June 15, 1987





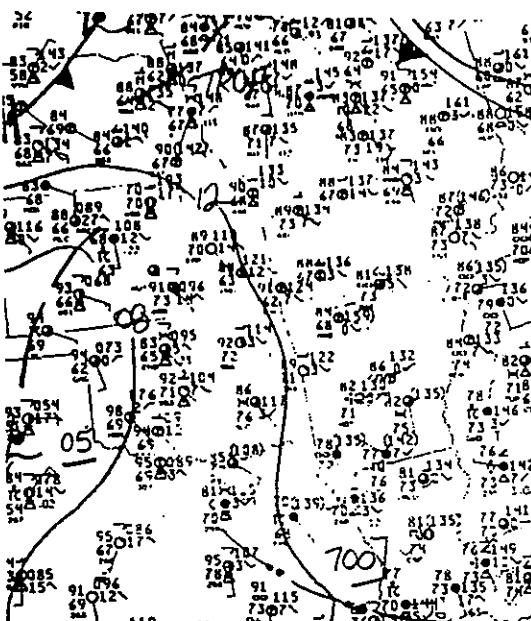
Composite 6PM CST June 17, 1987



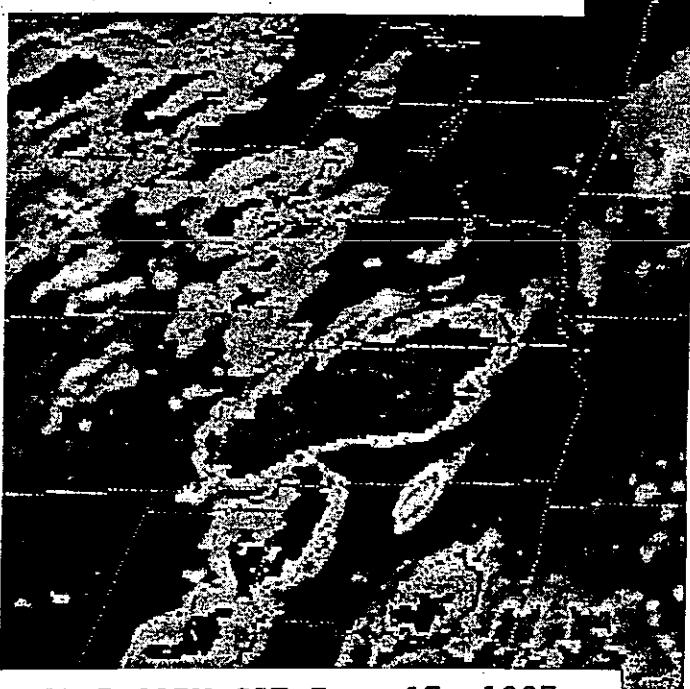
500MB 6PM CST June 17, 1987

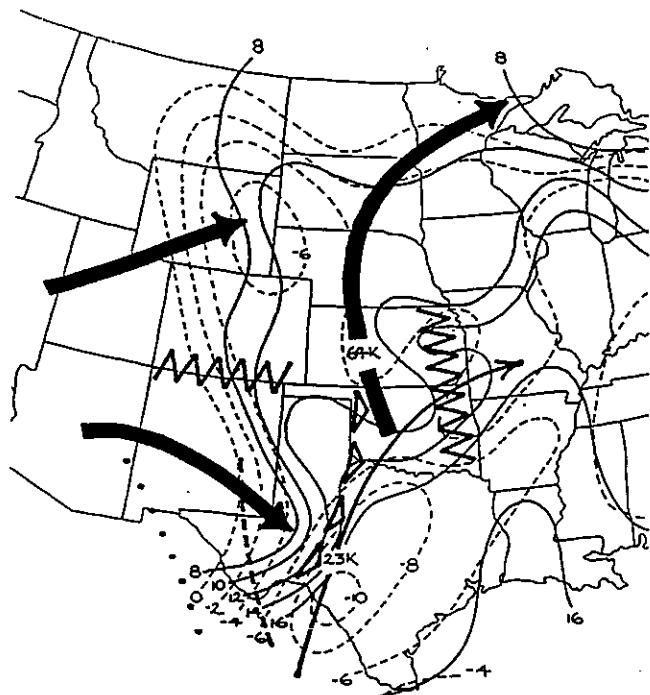
NO	TIME	EVENT	ST	LOCATION
1	1730	TORNADO-F1 1 DEATH 3 INJURIES	TX	PERRYTON
2	1801	86 MPH WIND GUST	TX	LUBBOCK
- 3	1815	2.75 INCH MAIL	KS	GARDEN CITY

17JUN87 1255-2300 CST 145 REPORTS 3 TORNADOES

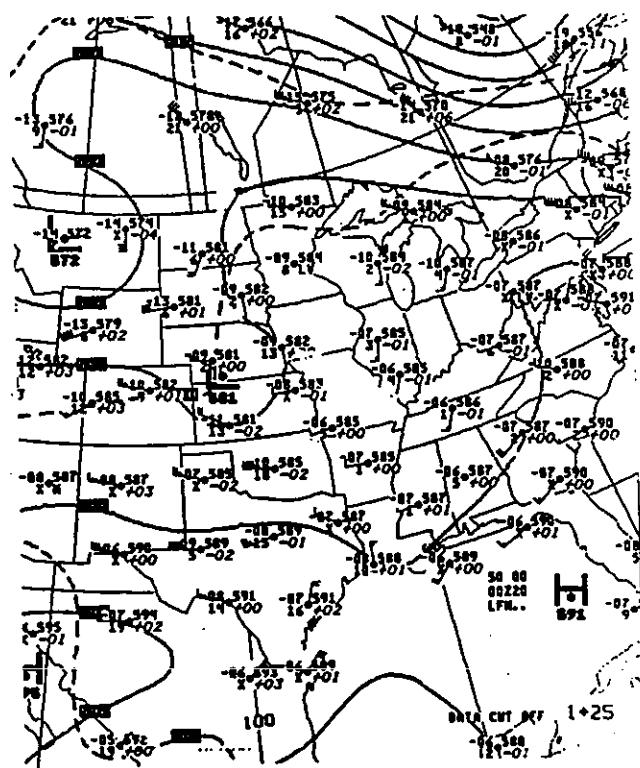


Surface 6PM CST June 17, 1987



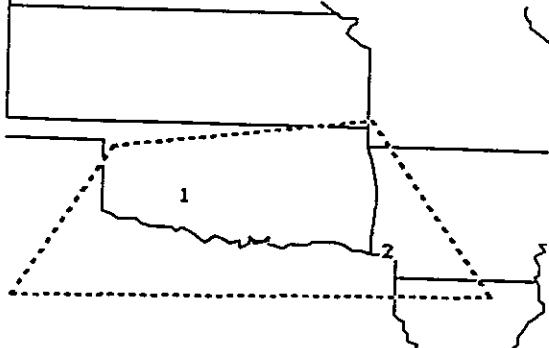


Composite 6PM CST June 19, 1987

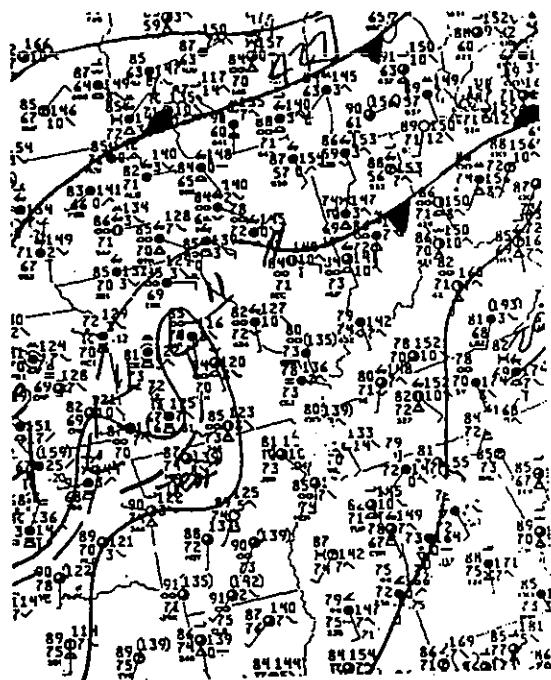


500MB 6PM CST June 19, 1987

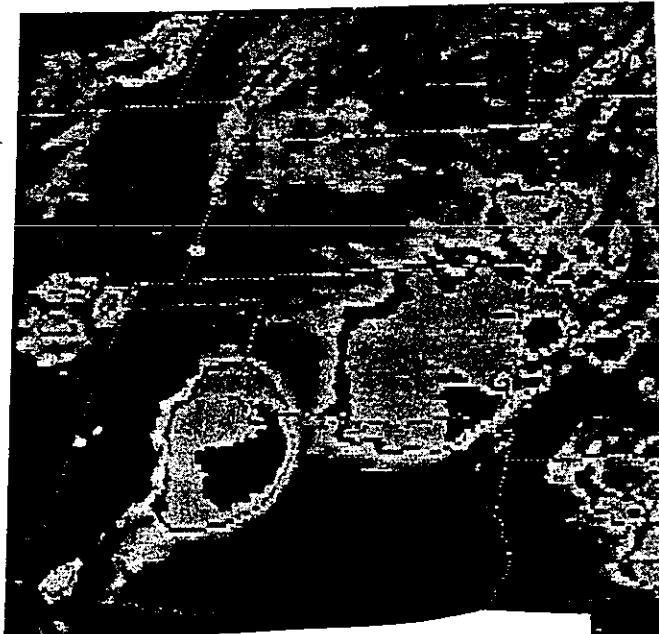
NO	TIME	EVENT	ST	LOCATION
1	1003	70 MPH WIND GUST	OK	ALBERT
2	1713	WIND GUST	AR	LITTLE RIVER COUNTY
				1 DEATH



19JUN87-20JUN87 0858-0315 CST 85 REPORTS 1 TORNADO

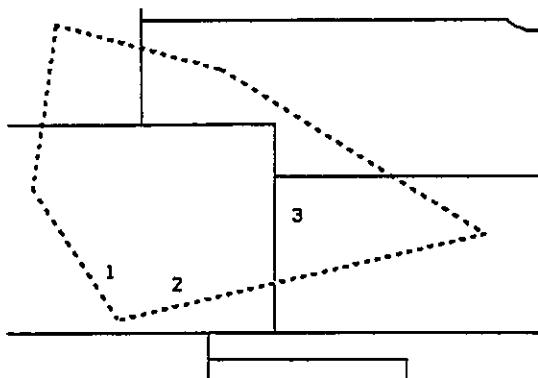


Surface 12 NOON CST June 19, 1987



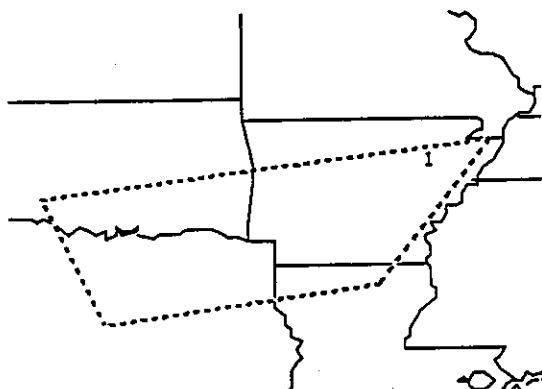
GOES 5:01PM CST June 19, 1987

NO	TIME	EVENT	ST	LOCATION	
1	2030	1.75 INCH HAIL	CO	PUEBLO	\$37 MILLION DAMAGE
2	2113	4.50 INCH HAIL	CO	LA JUNTA	
3	2232	77 MPH WIND GUST	KS	GOODLAND	

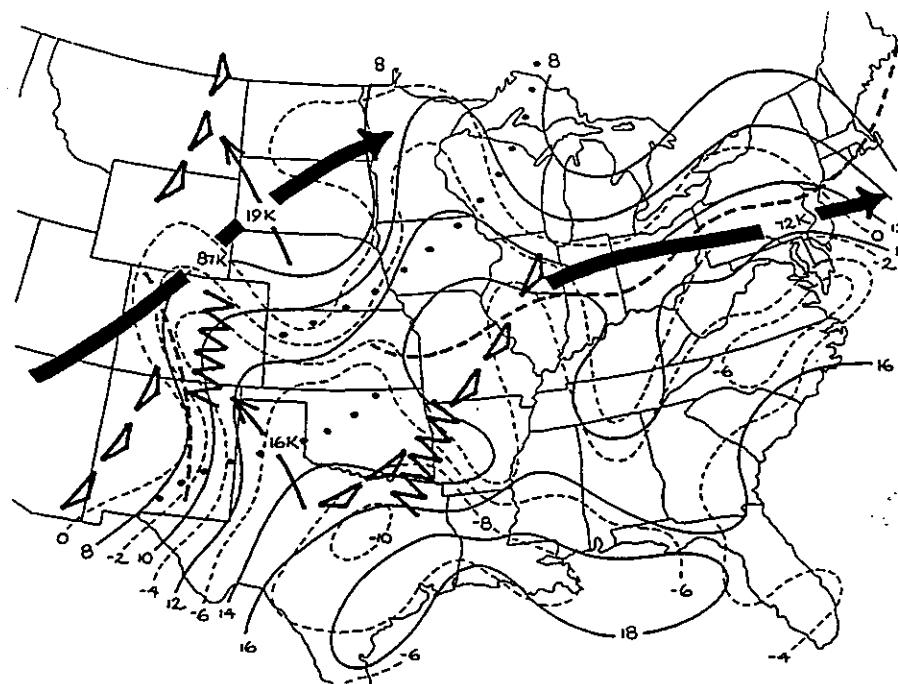


23JUN87 1431-2345 CST 54 REPORTS 5 TORNADOES

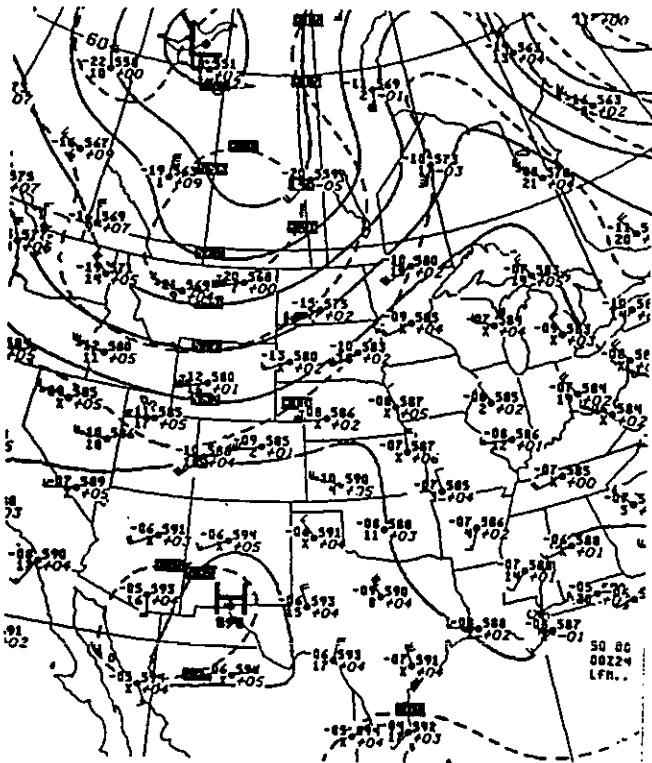
NO	TIME	EVENT	ST	LOCATION	
1	1120	72 MPH WIND GUST	PR	NEWPORT	



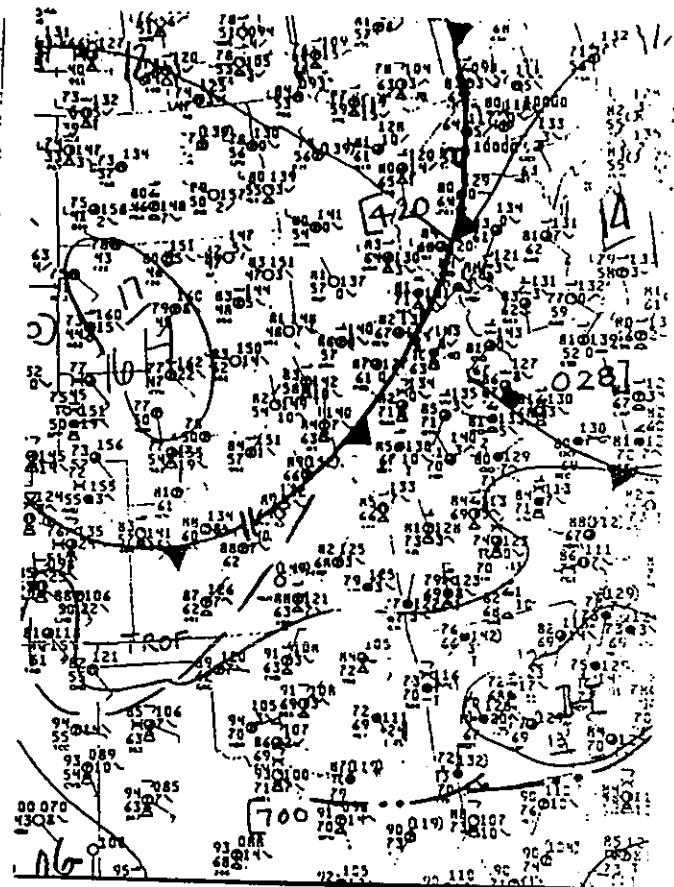
23JUN87 1014-2040 CST 67 REPORTS 3 TORNADOES



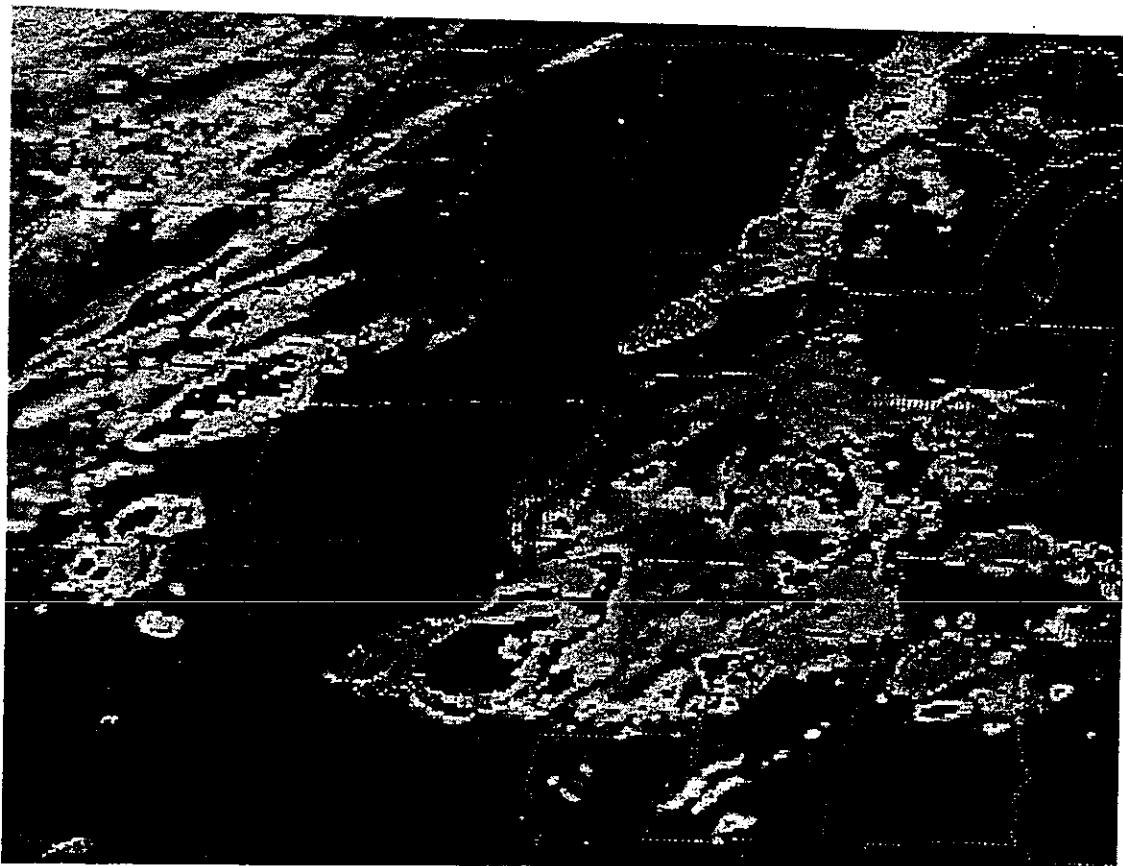
Composite 6PM CST June 23, 1987



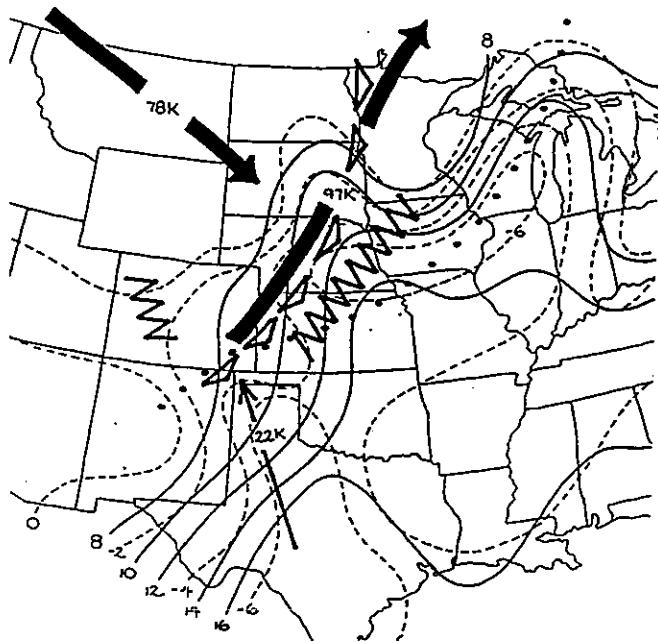
500MB 6PM CST June 23, 1987



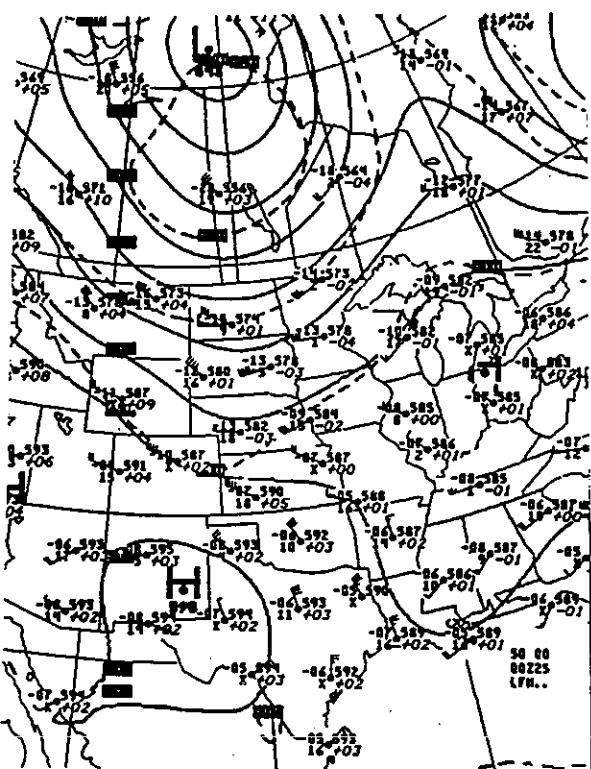
Surface 6PM CST June 23, 1987



GOES 5:01PM CST June 23, 1987

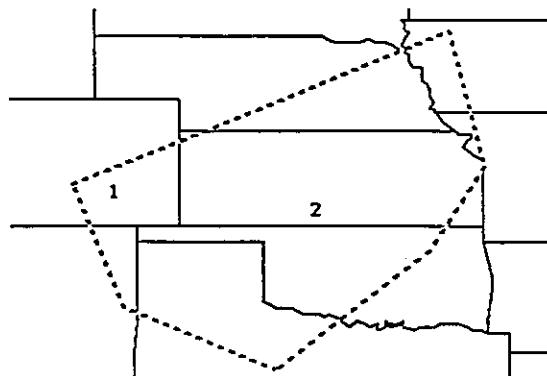


Composite 6PM CST June 24, 1987

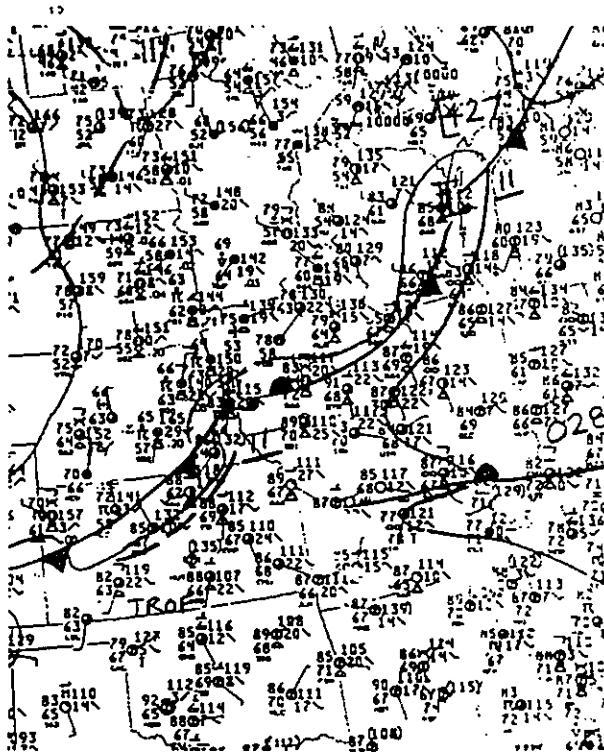


500MB 6PM CST June 24, 1987

NO	TIME	EVENT	ST	LOCATION
1	1823	2.75 INCH HAIL	CO	SUGAR CITY
2	2033	82 MPH WIND GUST	KS	PRATT

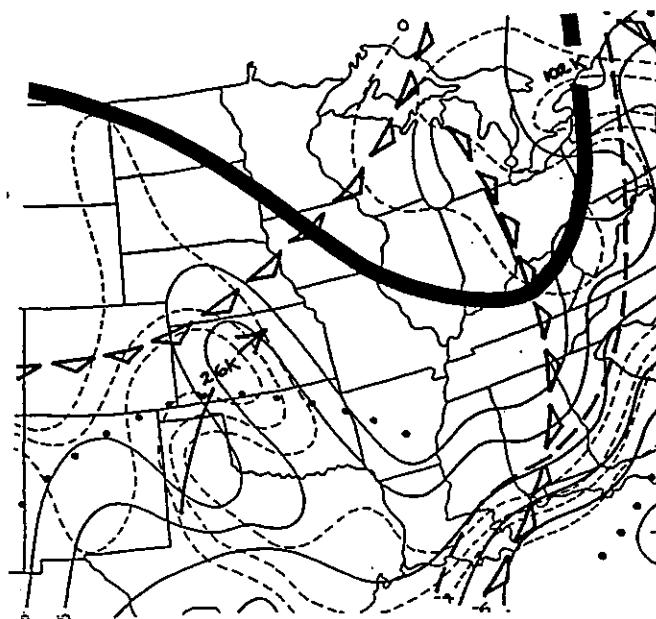


24JUN87-25JUN87 1425-0120 CST 83 REPORTS 10 TORNADOES

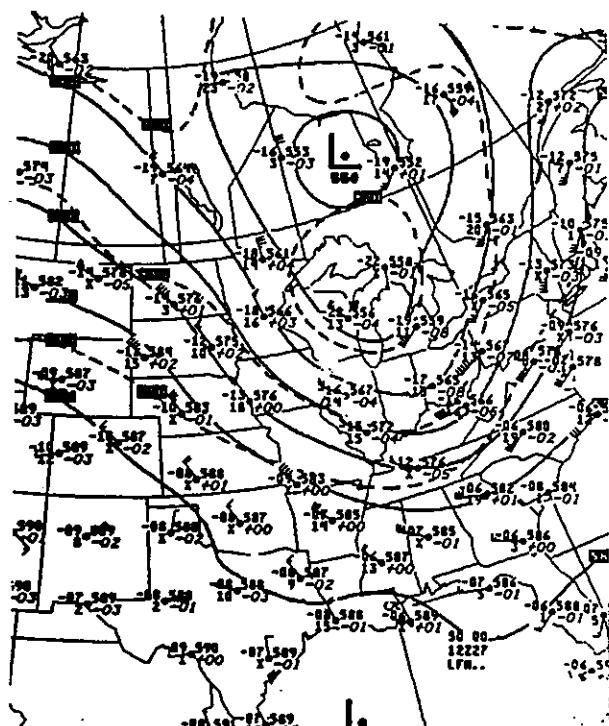


Surface 6PM CST June 24, 1987



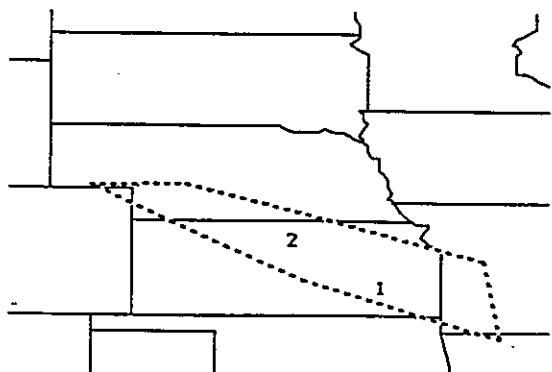


Composite 6AM CST June 27, 1987

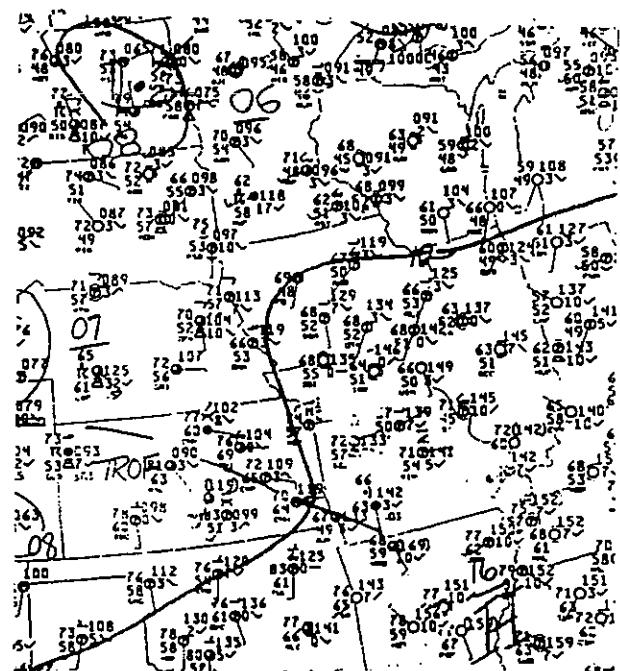


500MB 6AM CST June 27, 1987

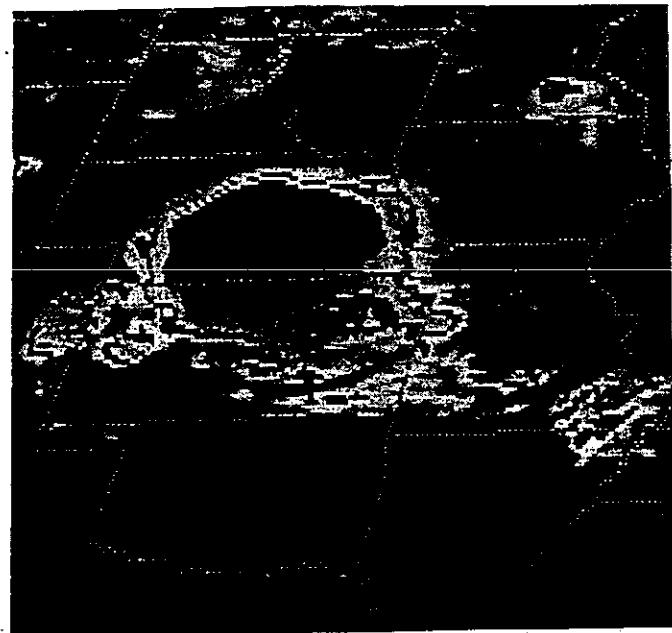
NO	TIME	EVENT	ST	LOCATION	
1	1615	2.75 INCH HAIL	KS	EUREKA	
2	2331	100 MPH WIND GUST	KS	GLEN ELDER	16 INJURIES



27JUN87-28JUN87 1620-0100 CST 48 REPORTS 5 TORNADOES

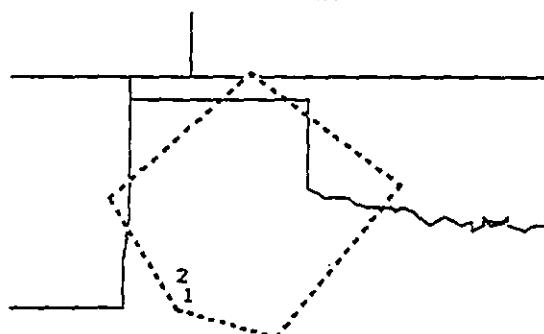


Surface 9PM CST June 27, 1987

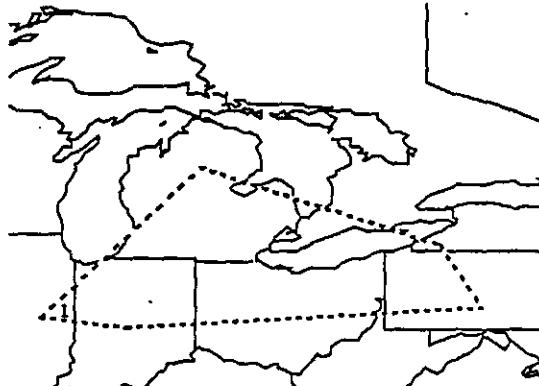


No. 58 June 29-30 1987

NO	TIME	EVENT	ST	LOCATION
1	2020	2.75 INCH HAIL	TX	STANTON
2	0030	81 MPH WIND GUST	TX	LAMESA



NO	TIME	EVENT	ST	LOCATION	S INJURIES
1	1504	58 MPH WIND GUST	IL	SAVOY	5 INJURIES

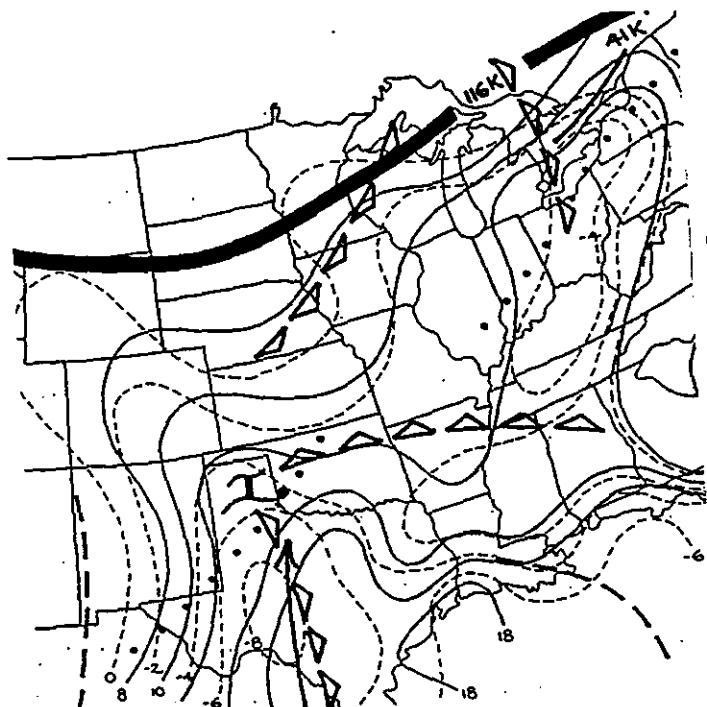


29JUN87-30JUN87 1230-0325 CST 33 REPORTS 1 TORNADO

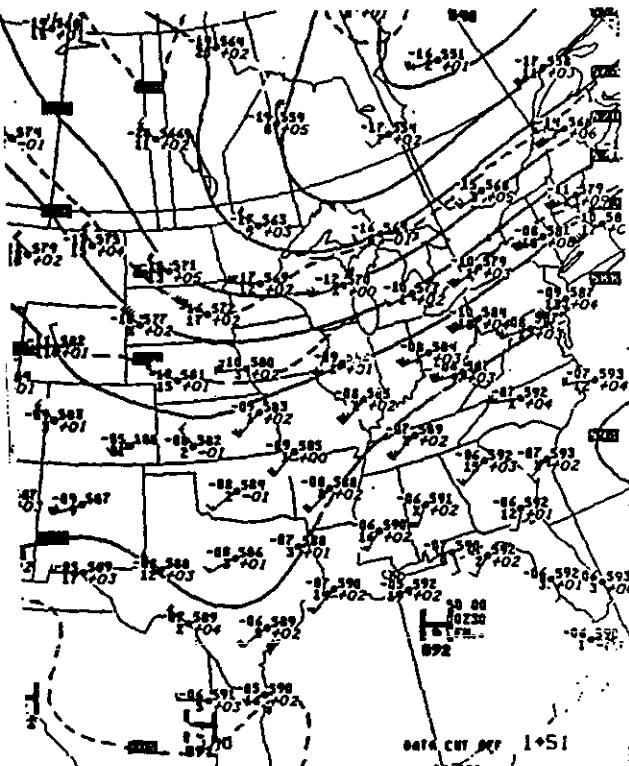
12 -

29JUN87 1105-2100 CST 76 REPORTS 6 TORNADOES

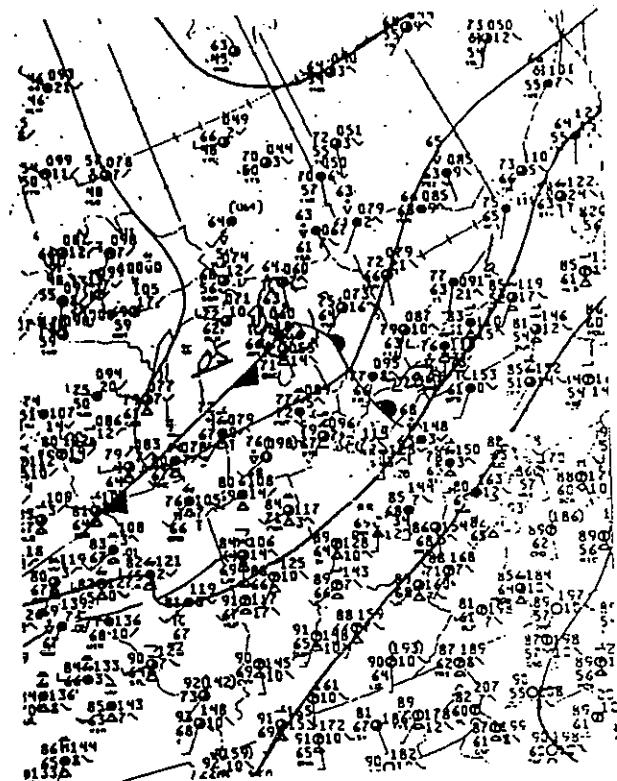
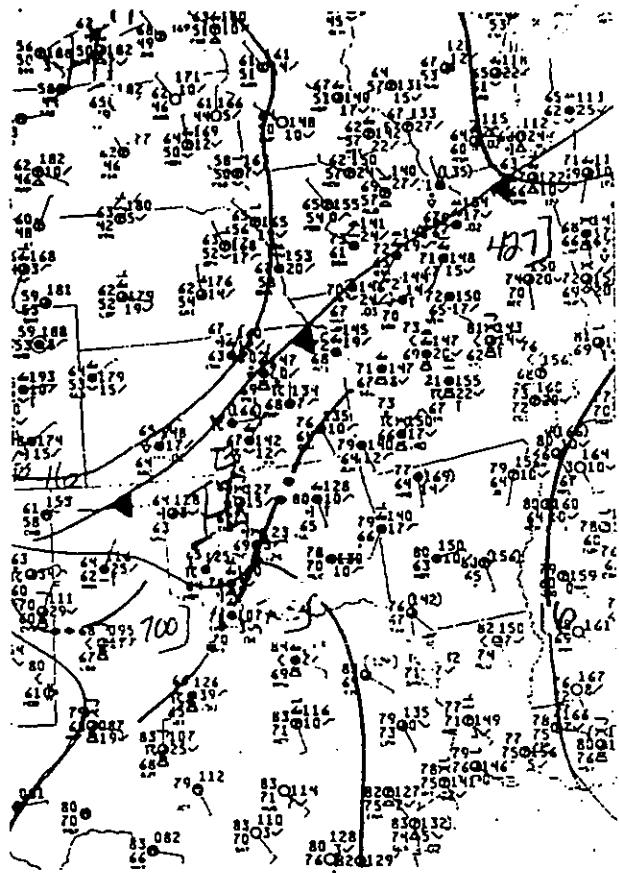
12 -



Composite 6PM CST June 29, 1987

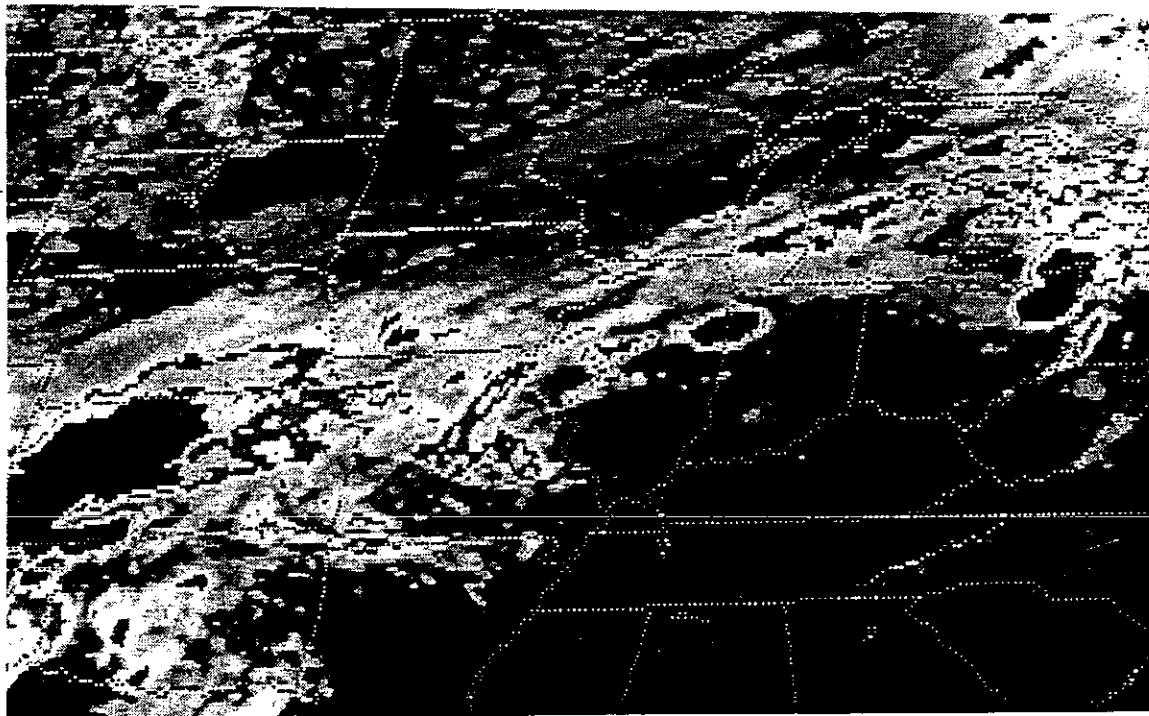


500MB 6PM CST June 29, 1987



Surface 3PM CST June 29, 1987

Surface 9PM CST June 29, 1987



GOES 2:01PM CST June 29, 1987