Funding provided by NOAA
Sectoral Applications Research Project

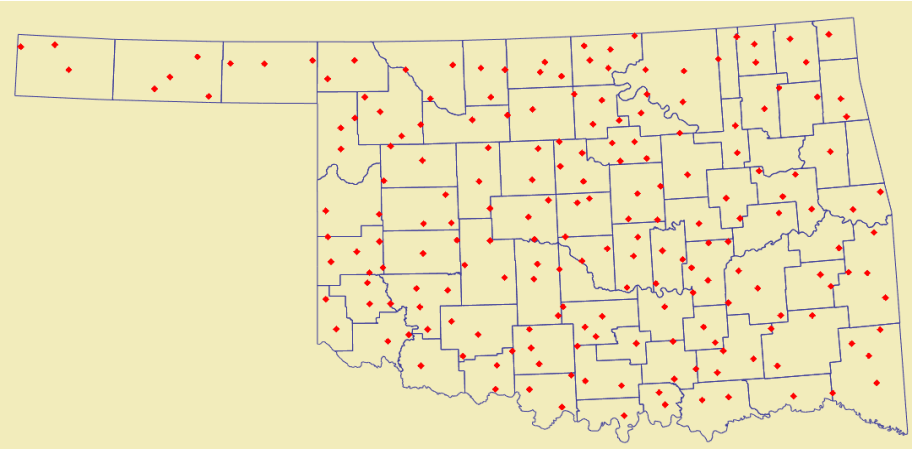
CLIMATE PRODUCTS

Basic Climatology
Oklahoma Climatological Survey

OBSERVING NETWORKS

Cooperative Observer Data (COOP)

- What is it?
  - Volunteers record temperature and precipitation observations once a day
  - Observations are either mailed on written forms or entered through the computer or a telephone system
  - Data are collected by the National Climatic Data Center (NCDC), where they are quality-assured
  - Typically takes 4-5 months before data are declared "official"
- What is observed?
  - Daily Maximum and Minimum Temperatures
  - Precipitation (liquid)
  - Snowfall, Snow Depth
- Where is it recorded?
  - ~8000 sites nationwide
  - ~200 active sites in Oklahoma
  - Dates back to before 1900

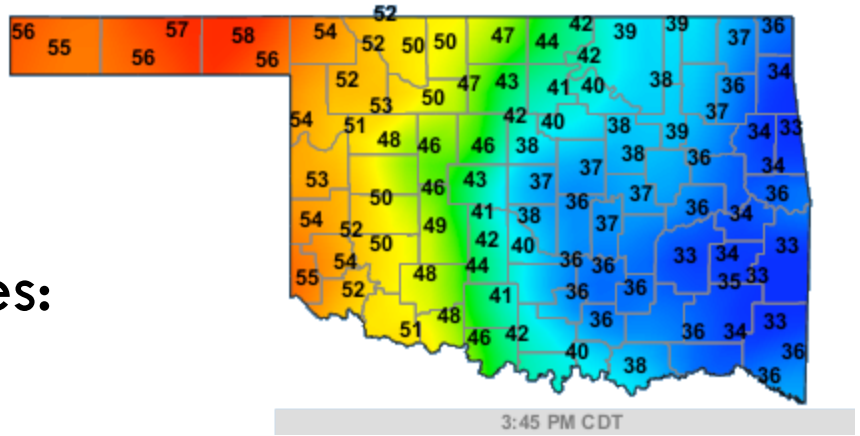


NWS – ASOS and AWOS

- Automated Surface Observing System (ASOS)
  - 882 NWS/FAA stations in the United States
  - Generally dating back to ~1940s
  - Hourly weather observations
- Automated Weather Observing System (AWOS)
  - Operated by the Federal Aviation Administration (FAA)
  - About 600 FAA stations in the United States
  - Older than ASOS
  - Usually do not report special observations (e.g., time of wind shifts)
- The original observations relate to WEATHER, not CLIMATE. But if we look at this information over a much longer period of time, we can see climate trends.

Oklahoma Mesonet

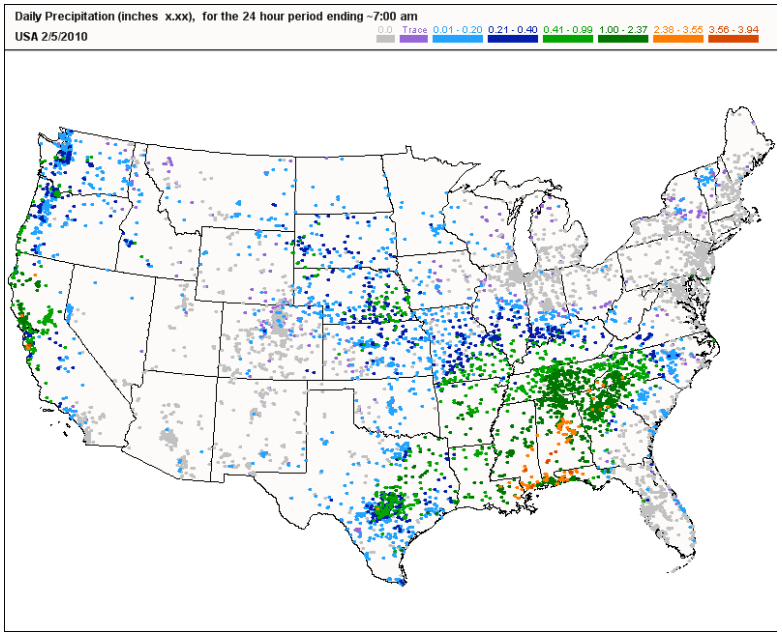
- County-level, real-time
- 120 stations in Oklahoma
- Commissioned in 1994
- Data reported every 5 minutes:
  - Temperature
  - Rainfall
  - Humidity
  - Winds
  - Sunshine (solar radiation)
  - Pressure
  - Soil temperature, soil moisture



http://www.mesonet.org

CoCoRaHS

- Community Collaborative Rain, Hail and Snow Network
- Volunteer observers report rain, snow, and hail each day
  - Online "journal" allows tracking over time, comparing with neighbors
- Established in Colorado in 1998
- Currently 11,000+ observers in all 50 states
- Goal: a raingauge every mile
  - Need County Coordinators!



http://www.cocorahs.org

Storm Reports

- NOAA Storm Data publication (monthly – OFFIICIAL RECORDS):
  http://www7.ncdc.noaa.gov/IPS/sd/sd.html
- NCDC Storm Events Database (usually 90-120 days behind the current month):
  http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storms
- Storm Prediction Center (unofficial reports usually up within a day or so):
  http://www.spc.noaa.gov/ (Reports tab)
- Local Storm Reports (issued by National Weather Service offices as events are reported)
- Contact your State Climate Office for assistance:
  http://www.stateclimate.org/

SOME USEFUL CLIMATE WEBSITES

NOAA Climate Prediction Center

www.cpc.noaa.gov

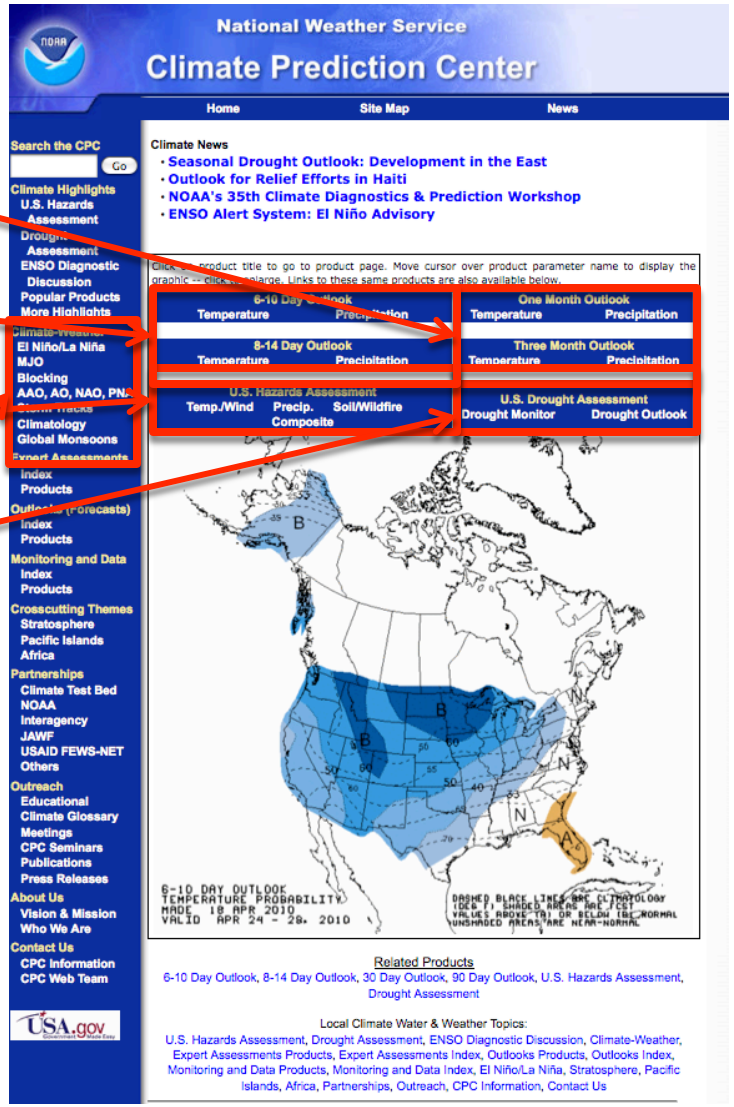
1 and 3 month outlooks

Short-term outlooks

U.S. Hazards Assessments

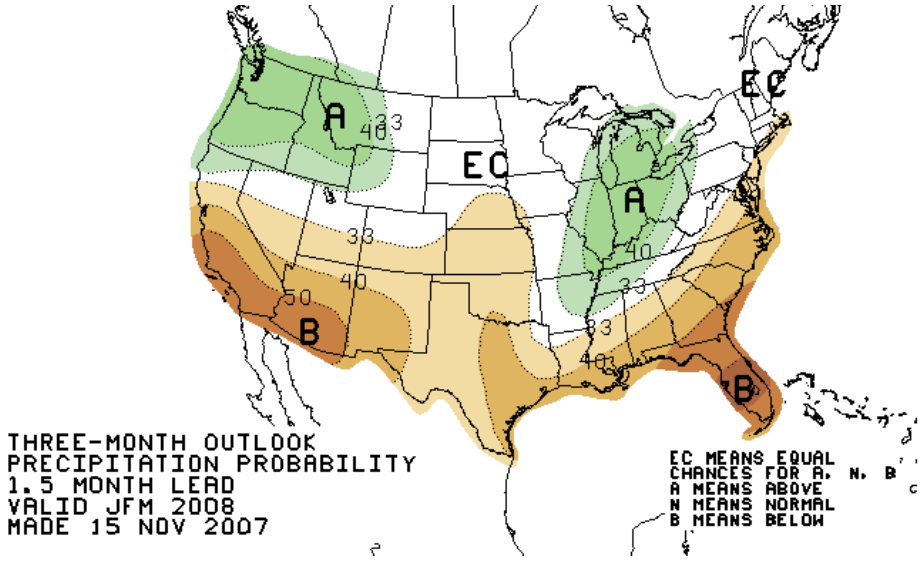
U.S. Drought Assessment
(also see www.drought.gov)

ENSO (El Nino/La Nina)



Seasonal Outlooks

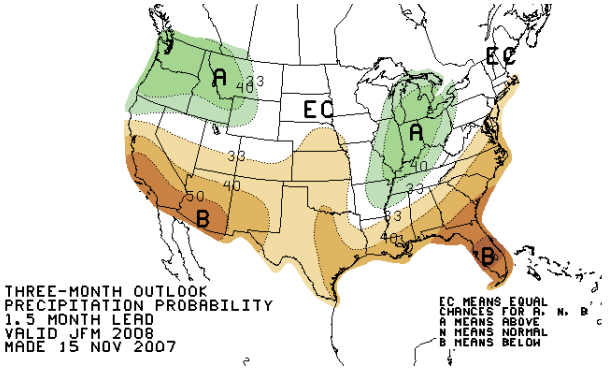
- From the Climate Prediction Center: http://www.cpc.noaa.gov/
- Three Month (seasonal) and One Month outlooks
- Forecast is actually how *confident* they are about general tendencies (above, below, or near normal)
  - The darker the shading, the more confident the forecaster is that warmer/cooler/near normal/wetter/drier conditions will occur



Interpreting Seasonal Outlooks

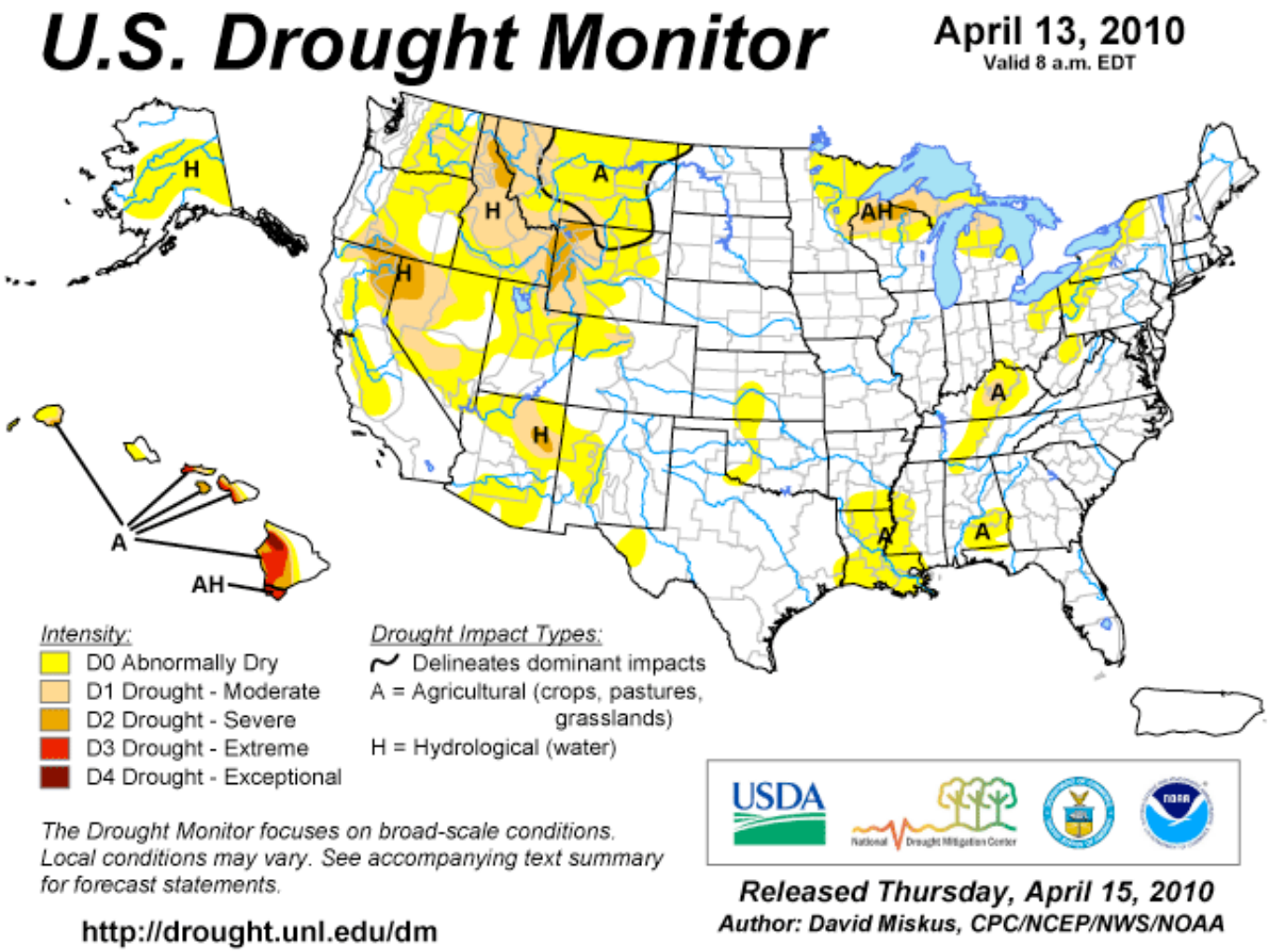
- A=Above, B=Below, N=Near Normal, EC=Equal Chances
- EC indicates a 33.3% chance of conditions falling into one of the three categories (above, near normal, or below)
- A (B) indicates that the forecaster thinks that conditions will be above (below) normal
  - Does not forecast how much above normal
- Any contours show an increased *confidence* in the forecast trend

	Above	Near Normal	Below
Equal Chances	33.3	33.3	33.3
40% Above	40.0	33.3	26.7
50% Below	16.7	33.3	50.0



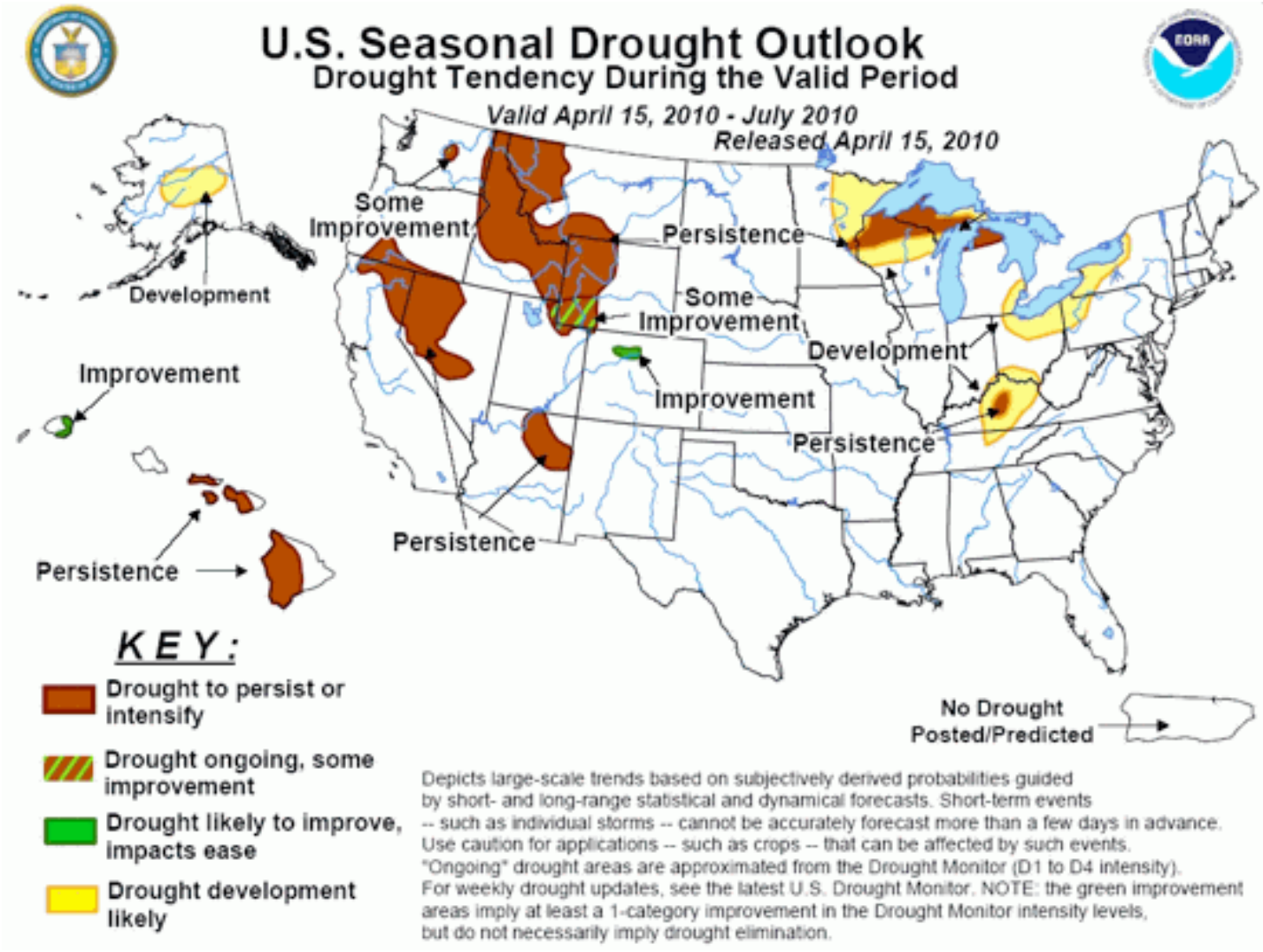
Drought Monitor

www.drought.gov



Drought Outlook

www.drought.gov



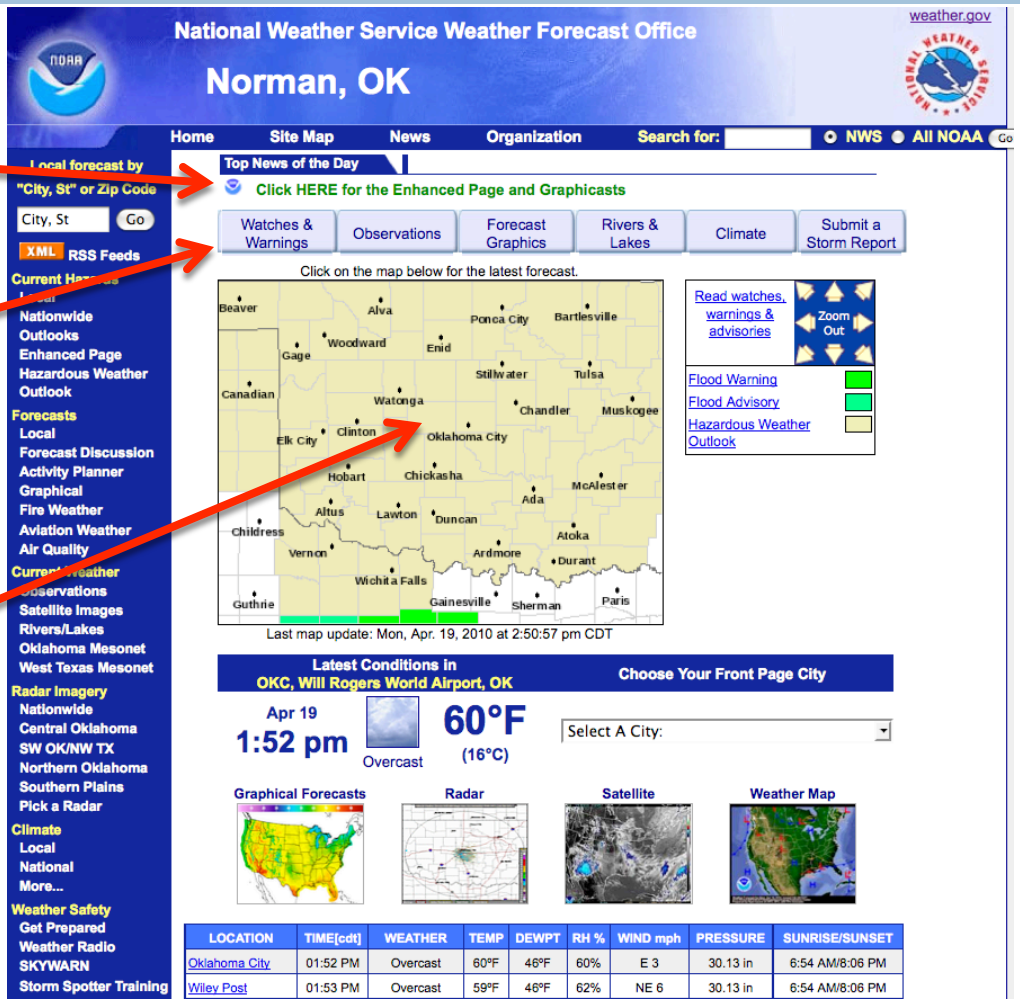
National Weather Service

Norman: www.srh.noaa.gov/oun/ Tulsa: www.srh.noaa.gov/tsa/

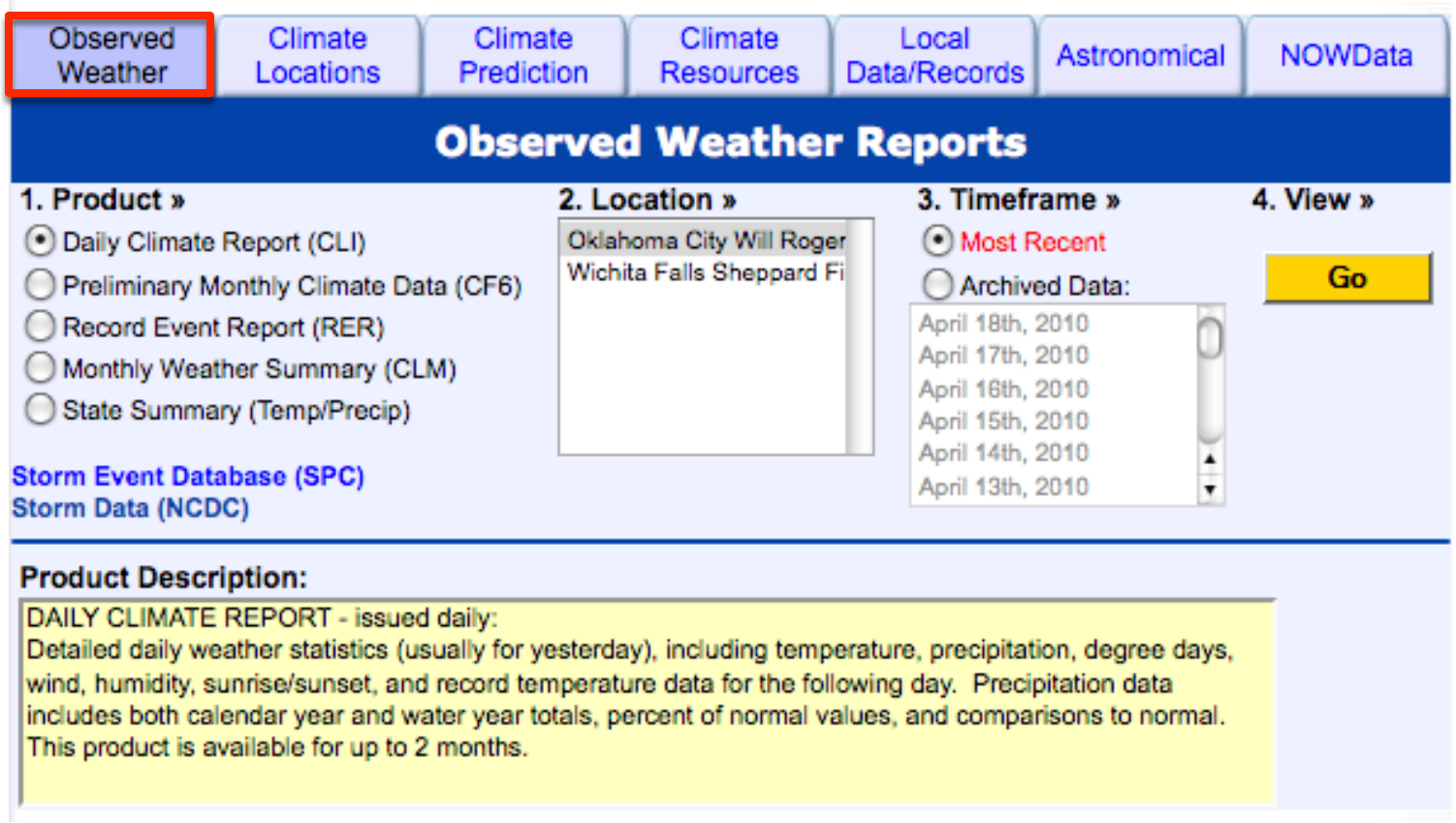
Enhanced Page (current concerns)

Data!

Point-and-click Forecasts



NWS – Climate Section



Daily Climate Report (CLI)

Climatological Report (Daily)

```
000
CDUS44 KOUN 190633
CLIOKC

CLIMATE REPORT
NATIONAL WEATHER SERVICE NORMAN OK
131 AM CDT MON APR 19 2010


.................................

...THE OKLAHOMA CITY CLIMATE SUMMARY FOR APRIL 18 2010...

CLIMATE NORMAL PERIOD 1971 TO 2000
CLIMATE RECORD PERIOD 1890 TO 2010


WEATHER ITEM   OBSERVED TIME   RECORD YEAR NORMAL DEPARTURE LAST
                VALUE   (LST)  VALUE       VALUE  FROM      YEAR
                                                   NORMAL
.....................................................................
TEMPERATURE (F)
 YESTERDAY
  MAXIMUM         53    212 AM  96    1925  72     -19       72
  MINIMUM         48   1159 PM  30    1953  49      -1       49
  AVERAGE         51                       60      -9       61

PRECIPITATION (IN)
  YESTERDAY       0.93          2.97 1942   0.10   0.83     0.12
  MONTH TO DATE   2.38                      1.63   0.75     1.64
  SINCE MAR 1     3.34                      4.53  -1.19     4.17
  SINCE JAN 1     8.58                      7.37   1.21     5.58

SNOWFALL (IN)
  YESTERDAY       0.0           0.0    MM   0.0    0.0      0.0
  MONTH TO DATE   T                         T      0.0      0.0
  SINCE JUL 1    23.2                       8.6   14.6      3.1

DEGREE DAYS
 HEATING
  YESTERDAY       14                        6      8        4
  MONTH TO DATE   79                      141    -62      182
  SINCE MAR 1    557                      587    -30      543
  SINCE JUL 1   3795                     3563    232     3232

 COOLING
  YESTERDAY        0                        1     -1        0
  MONTH TO DATE   31                       17     14        2
  SINCE MAR 1     40                       24     16       25
  SINCE JAN 1     40                       25     15       26
.....................................................................

WIND (MPH)
  HIGHEST WIND SPEED    16   HIGHEST WIND DIRECTION     E (70)
  HIGHEST GUST SPEED    20   HIGHEST GUST DIRECTION    NE (60)
  AVERAGE WIND SPEED    10.1


SKY COVER
  AVERAGE SKY COVER 1.0


WEATHER CONDITIONS
 THE FOLLOWING WEATHER WAS RECORDED YESTERDAY.
  RAIN
  LIGHT RAIN
  FOG


RELATIVE HUMIDITY (PERCENT)
 HIGHEST     96          300 AM
 LOWEST      77          600 PM
 AVERAGE     87


.....................................................


THE OKLAHOMA CITY CLIMATE NORMALS FOR TODAY
                              NORMAL    RECORD     YEAR
 MAXIMUM TEMPERATURE (F)      72        94         1987
 MINIMUM TEMPERATURE (F)      49        35         1953


SUNRISE AND SUNSET
APRIL 19 2010.........SUNRISE   653 AM CDT   SUNSET   807 PM CDT
APRIL 20 2010.........SUNRISE   652 AM CDT   SUNSET   807 PM CDT


-  INDICATES NEGATIVE NUMBERS.
R  INDICATES RECORD WAS SET OR TIED.
MM INDICATES DATA IS MISSING.
T  INDICATES TRACE AMOUNT.
```

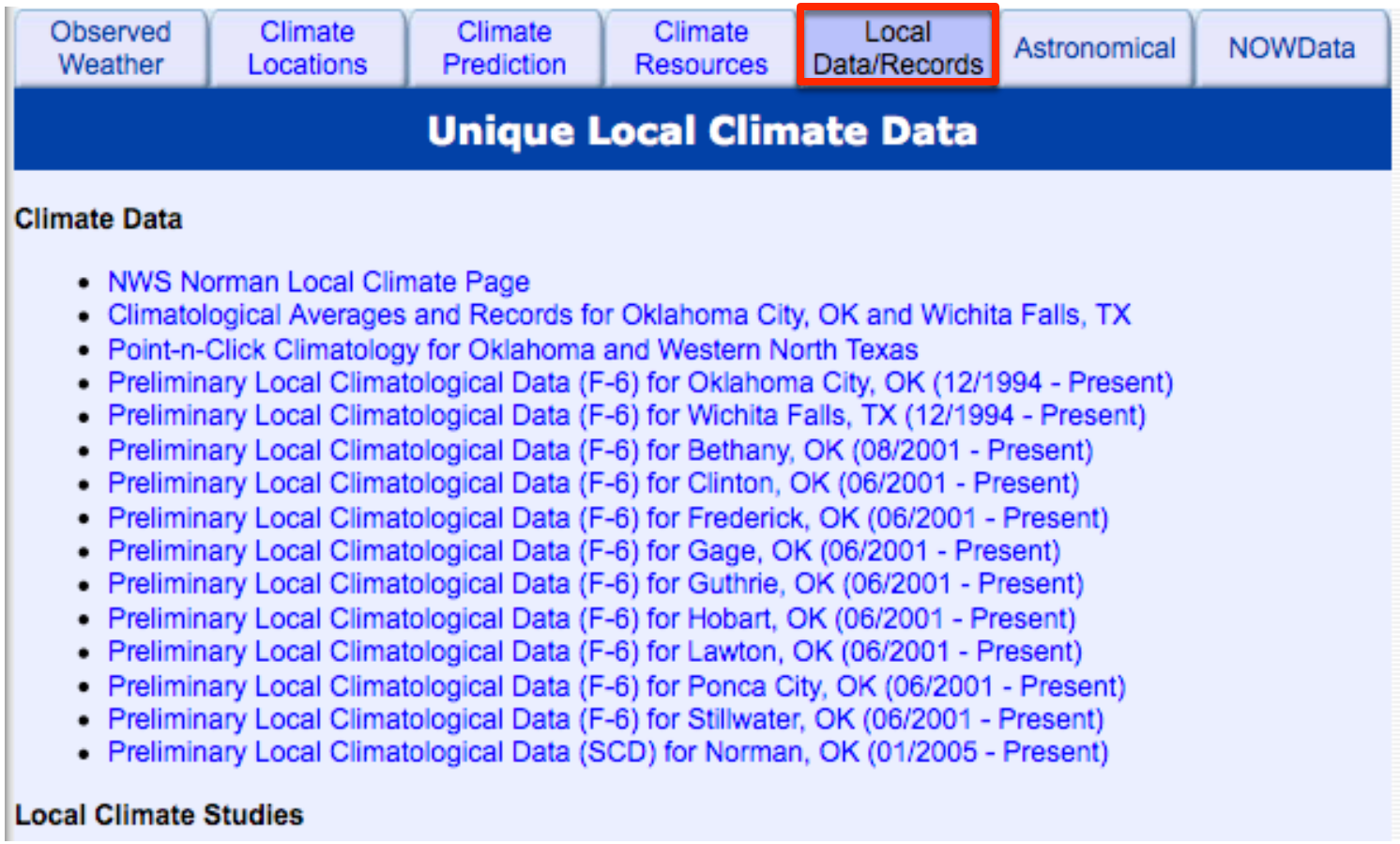
Monthly Climate Data (f6)

WFO Monthly/Daily Climate Data

```
000
CXUS54 KOUN 010800
CF6OKC
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

                                        STATION:   OKLAHOMA CITY
                                        MONTH:     DECEMBER
                                        YEAR:      2009
                                        LATITUDE:   35 24 N
                                        LONGITUDE:  97 36 W

  TEMPERATURE IN F:       :PCPN:    SNOW:  WIND      :SUNSHINE: SKY     :PK WND
=============================================================================
1   2   3   4   5  6A  6B    7    8    9   10  11  12  13   14  15   16   17  18
                                    12Z  AVG MX 2MIN
DY MAX MIN AVG DEP HDD CDD  WTR  SNW DPTH SPD SPD DIR MIN PSBL S-S WX    SPD DR
=============================================================================

 1  53  31  42  -1  23   0 0.08  0.0    0  5.8 18 190   M    M   6        23 170
 2  44  34  39  -4  26   0 0.35    T    0 16.6 30 340   M    M   7 1      39 360
 3  38  24  31 -12  34   0 0.00  0.0    0 10.5 20 330   M    M   5        24  10
 4  37  19  28 -14  37   0 0.00  0.0    0  6.4 13 270   M    M   1        16 270
 5  48  21  35  -7  30   0 0.00  0.0    0 15.5 24 160   M    M   4        31 170
 6  47  31  39  -3  26   0 0.00  0.0    0 16.1 25 190   M    M  10        32 180
 7  35  25  30 -11  35   0    T  0.0    0 11.0 24 350   M    M  10 168    30 350
 8  41  21  31 -10  34   0 0.02  0.0    0 13.2 37 320   M    M   9 168    47 320
 9  27  14  21 -20  44   0 0.00  0.0    0 15.4 30 320   M    M   1        37 320
10  35  11  23 -18  42   0 0.00  0.0    0  4.1  8 130   M    M   2        21  30
11  39  17  28 -12  37   0 0.00  0.0    0  6.5 14 160   M    M   4        16 160
12  49  25  37  -3  28   0 0.00  0.0    0 13.8 22 180   M    M   9 1      26 190
13  70  37  54  14  11   0 0.00  0.0    0 12.2 26 210   M    M   6 12     32 220
14  54  23  39  -1  26   0 0.00  0.0    0 16.0 29 340   M    M   6 8      35 320
15  35  17  26 -13  39   0 0.00  0.0    0 11.4 22 360   M    M   3        30 350
16  53  17  35  -4  30   0 0.00  0.0    0  9.1 20 200   M    M   1        24 190
17  58  27  43   4  22   0 0.00  0.0    0  9.9 20 190   M    M   2        24 190
18  58  34  46   7  19   0 0.00  0.0    0 13.7 23 340   M    M   1        28 330
19  42  23  33  -6  32   0 0.00  0.0    0 10.3 23 340   M    M   3 18     26 350
20  60  22  41   3  24   0 0.00  0.0    0  7.0 17 260   M    M   1 18     21 250
21  64  30  47   9  18   0 0.00  0.0    0 11.1 22 180   M    M   3        26 190
22  58  42  50  12  15   0 0.00  0.0    0 11.3 17 130   M    M   7 1      22 180
23  55  36  46   8  19   0 0.00  0.0    0 13.3 28 360   M    M  10 18     33 360
24  36  21  29  -9  36   0 0.95 13.5    0 35.1 49 340   M    M   9 1469   62 330
25  36  19  28 -10  37   0 0.00  0.0   14 16.8 31 280   M    M   1        39 270
26  37  21  29  -8  36   0 0.00  0.0   10 11.3 23 290   M    M   1        28 280
27  36  22  29  -8  36   0 0.00  0.0   10  9.2 23 330   M    M   5        26 330
28  43  19  31  -6  34   0 0.00  0.0    7  5.3 13 340   M    M   2        15 330
29  36  25  31  -6  34   0 0.07  0.5    5  6.0 16 180   M    M   9 1      18 190
30  44  32  38   1  27   0    T    T    6 10.0 18 200   M    M   9 12     22 190
31  36  25  31  -6  34   0 0.00  0.0    5 10.6 20 350   M    M   8 18     22 350
=============================================================================
SM 1404  765       925   0  1.47    14.0 364.5          M      155
=============================================================================
AV 45.3 24.7                             11.8 FASTST   M    M   5    MAX(MPH)
                                  MISC ---->  # 49 340                # 62  330
=============================================================================
NOTES:
# LAST OF SEVERAL OCCURRENCES

COLUMN 17 PEAK WIND IN M.P.H.
```

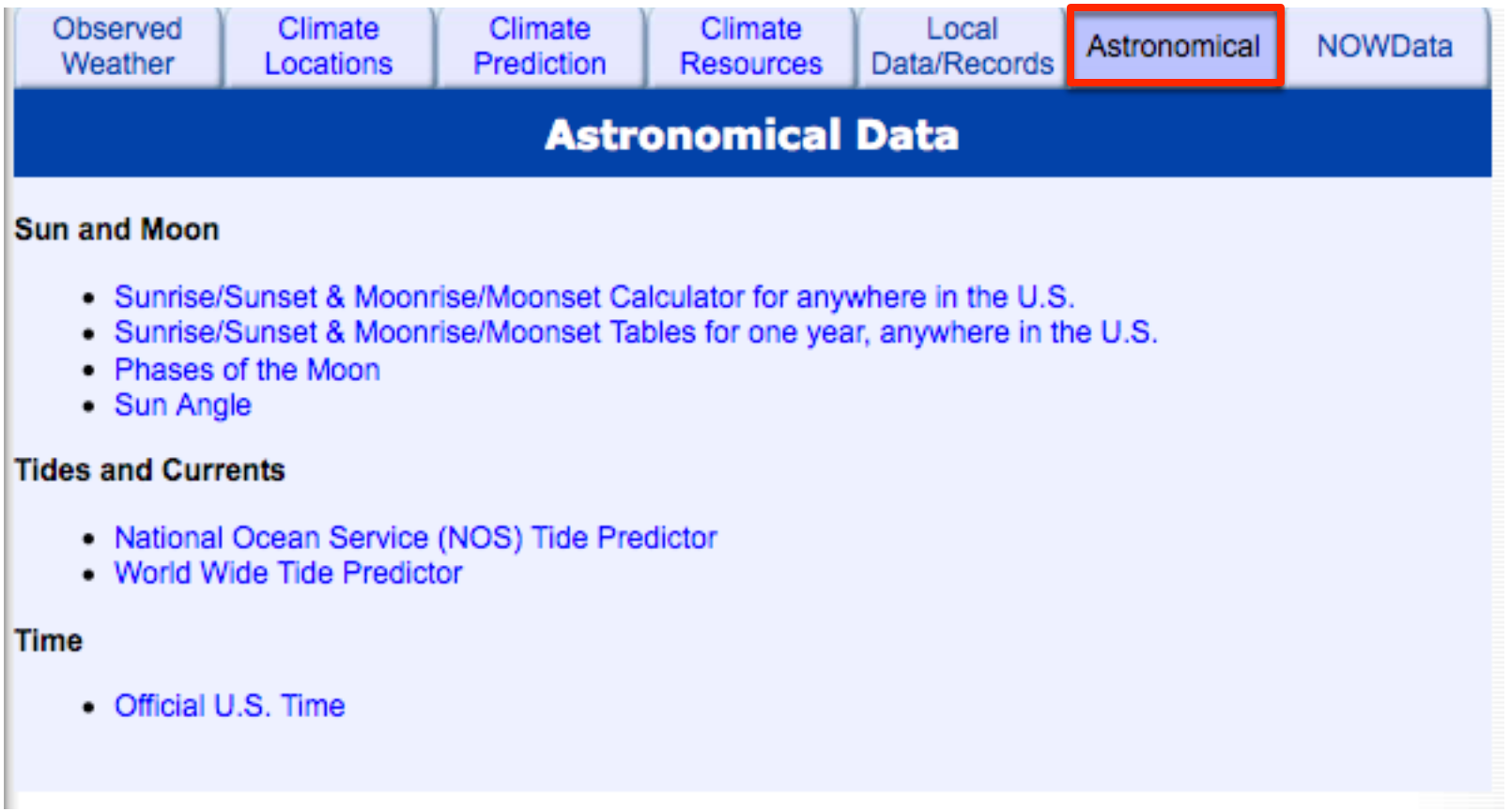
```
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6) , PAGE 2

                                        STATION:  OKLAHOMA CITY
                                        MONTH:    DECEMBER
                                        YEAR:     2009
                                        LATITUDE:   35 24 N
                                        LONGITUDE:  97 36 W

[TEMPERATURE DATA]      [PRECIPITATION DATA]       SYMBOLS USED IN COLUMN 16

AVERAGE MONTHLY: 35.0   TOTAL FOR MONTH:   1.47    1 = FOG OR MIST
DPTR FM NORMAL:  -4.5   DPTR FM NORMAL:   -0.42    2 = FOG REDUCING VISIBILITY
HIGHEST:     70 ON 13   GRTST 24HR  0.95 ON 24-24      TO 1/4 MILE OR LESS
LOWEST:      11 ON 10                               3 = THUNDER
                        SNOW, ICE PELLETS, HAIL    4 = ICE PELLETS
                        TOTAL MONTH:  14.0 INCHES  5 = HAIL
                        GRTST 24HR  13.5 ON 24-24  6 = FREEZING RAIN OR DRIZZLE
                        GRTST DEPTH:  14 ON 25     7 = DUSTSTORM OR SANDSTORM:
                                                       VSBY 1/2 MILE OR LESS
                                                   8 = SMOKE OR HAZE
[NO. OF DAYS WITH]      [WEATHER - DAYS WITH]      9 = BLOWING SNOW
                                                   X = TORNADO
MAX 32 OR BELOW:   1    0.01 INCH OR MORE:   5
MAX 90 OR ABOVE:   0    0.10 INCH OR MORE:   2
MIN 32 OR BELOW:  26    0.50 INCH OR MORE:   1
MIN  0 OR BELOW:   0    1.00 INCH OR MORE:   0

[HDD (BASE 65) ]
TOTAL THIS MO.   925    CLEAR  (SCALE 0-3)  13
DPTR FM NORMAL   145    PTCLDY (SCALE 4-7)  10
TOTAL FM JUL 1  1558    CLOUDY (SCALE 8-10)  8
DPTR FM NORMAL   114

[CDD (BASE 65) ]
TOTAL THIS MO.     0
DPTR FM NORMAL     0    [PRESSURE DATA]
TOTAL FM JAN 1  1854    HIGHEST SLP M ON M
DPTR FM NORMAL   -53    LOWEST  SLP 29.40 ON  8

[REMARKS]
#FINAL-12-09#
```

NWS – Climate Section

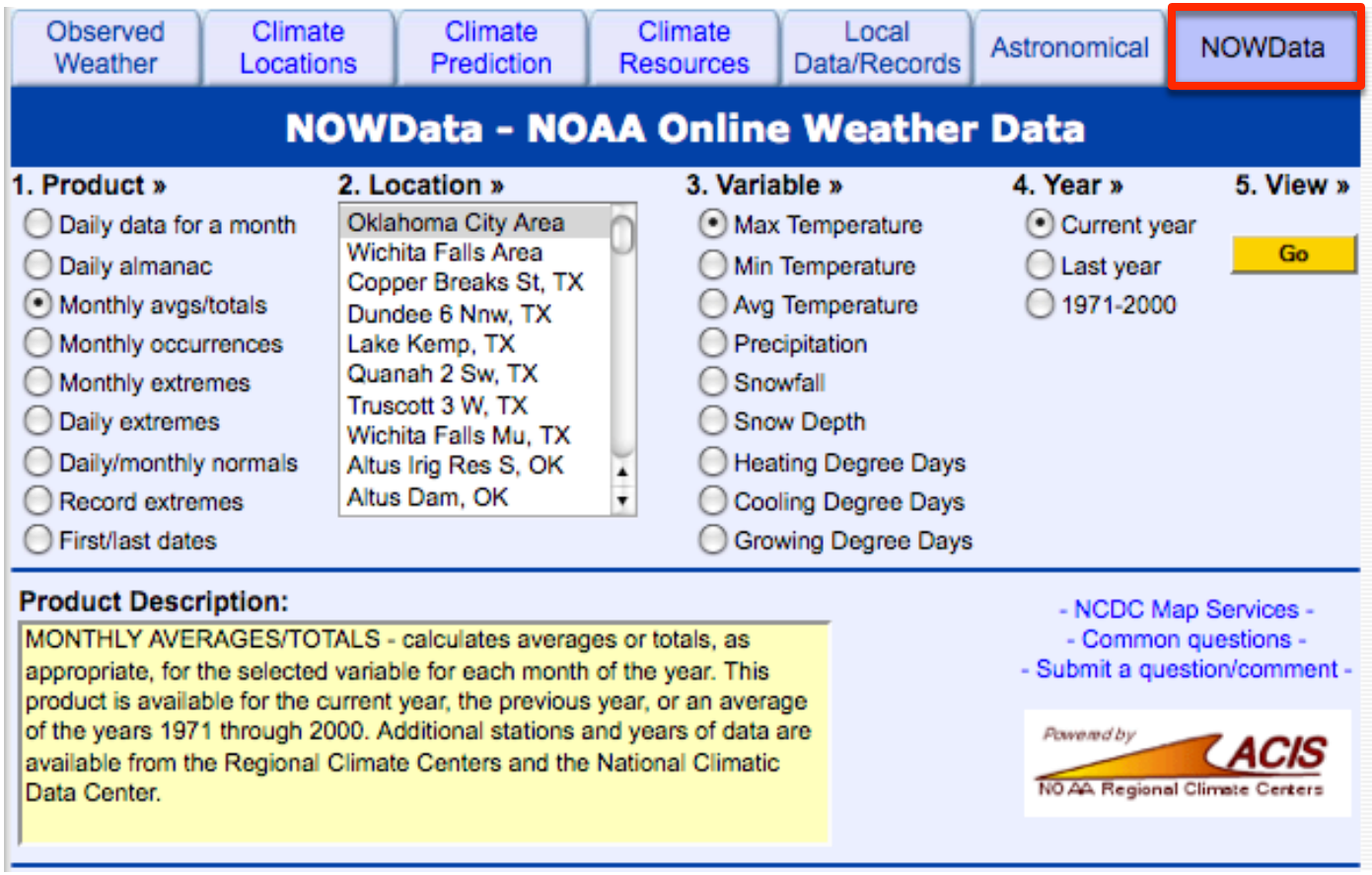


Summaries, studies, and resources produced by the local office

NWS – Climate Section

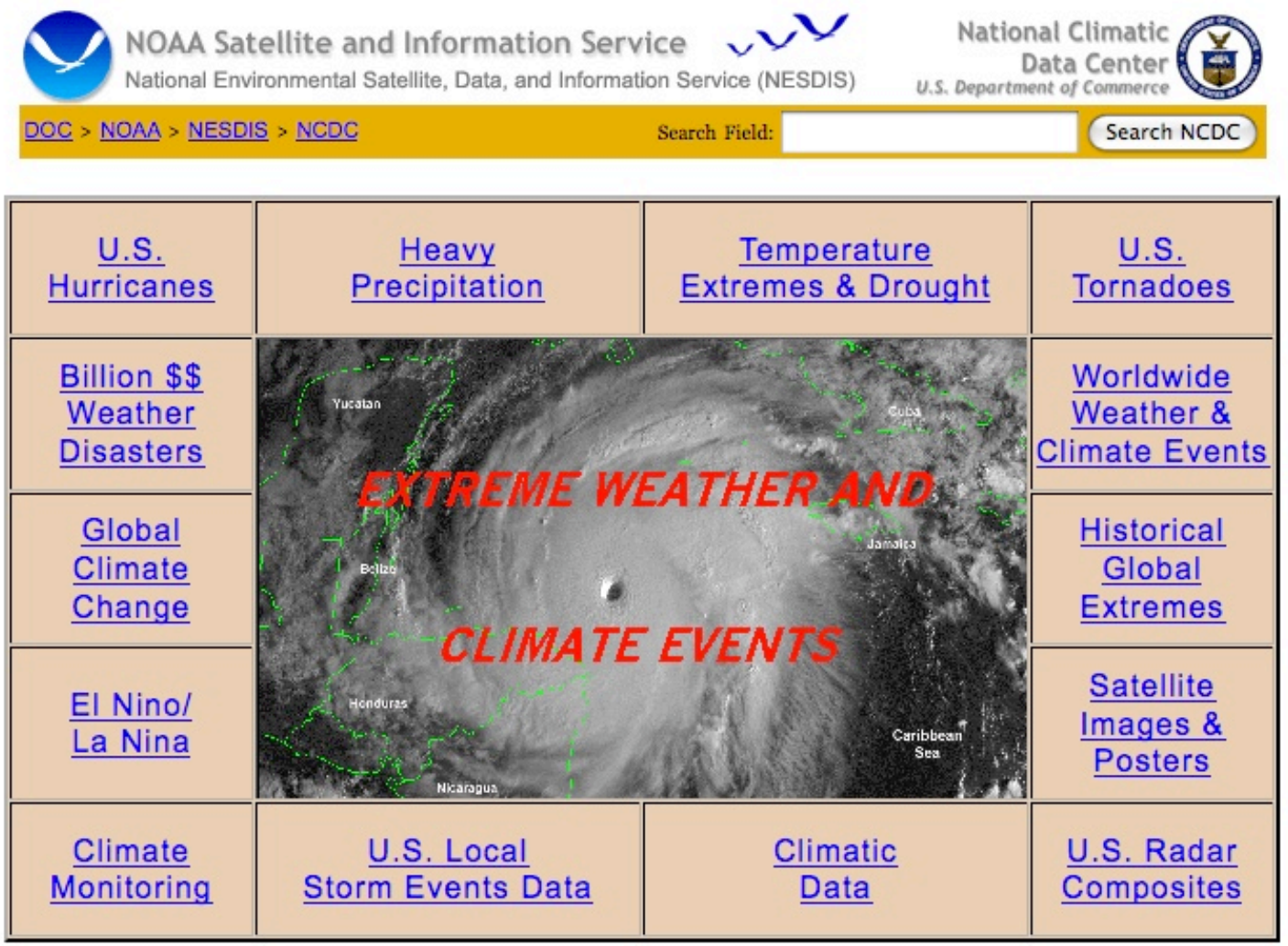


NWS – Climate Section



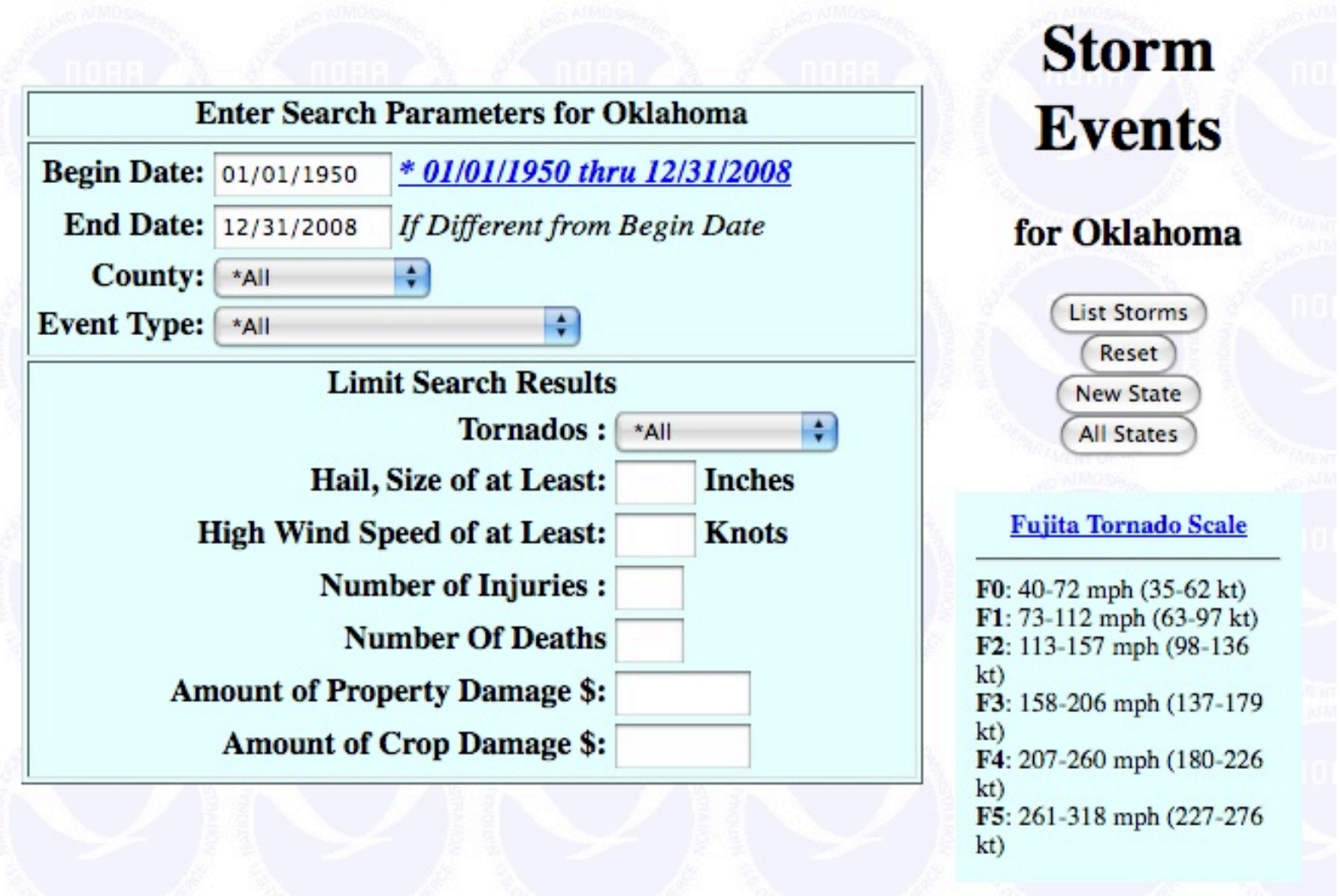
National Climatic Data Center

http://www.ncdc.noaa.gov/oa/climate/severeweather/extremes.html



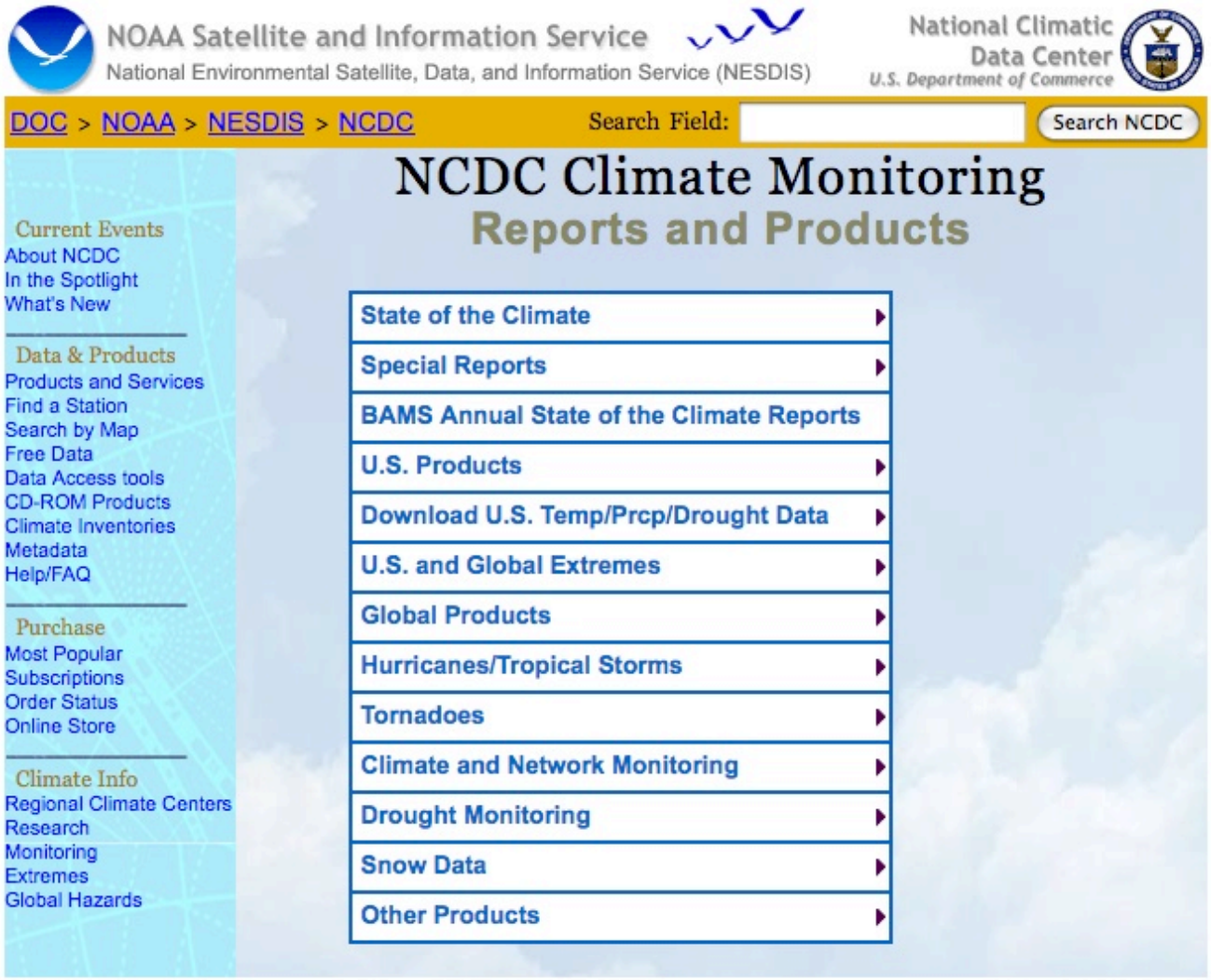
National Climatic Data Center

Storm Events Database



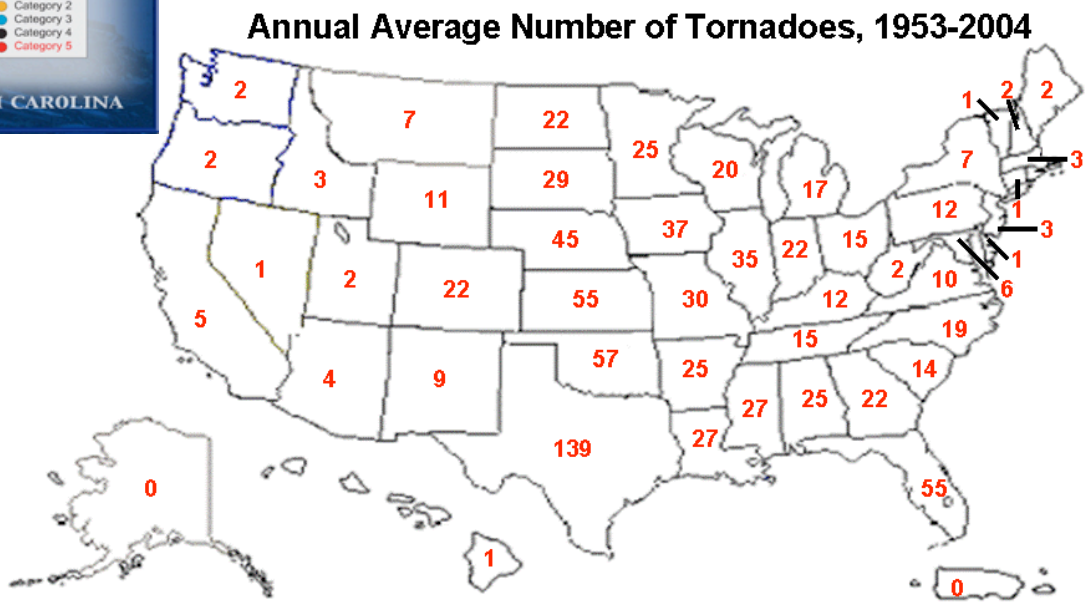
National Climatic Data Center

Climate Monitoring Reports



National Climatic Data Center

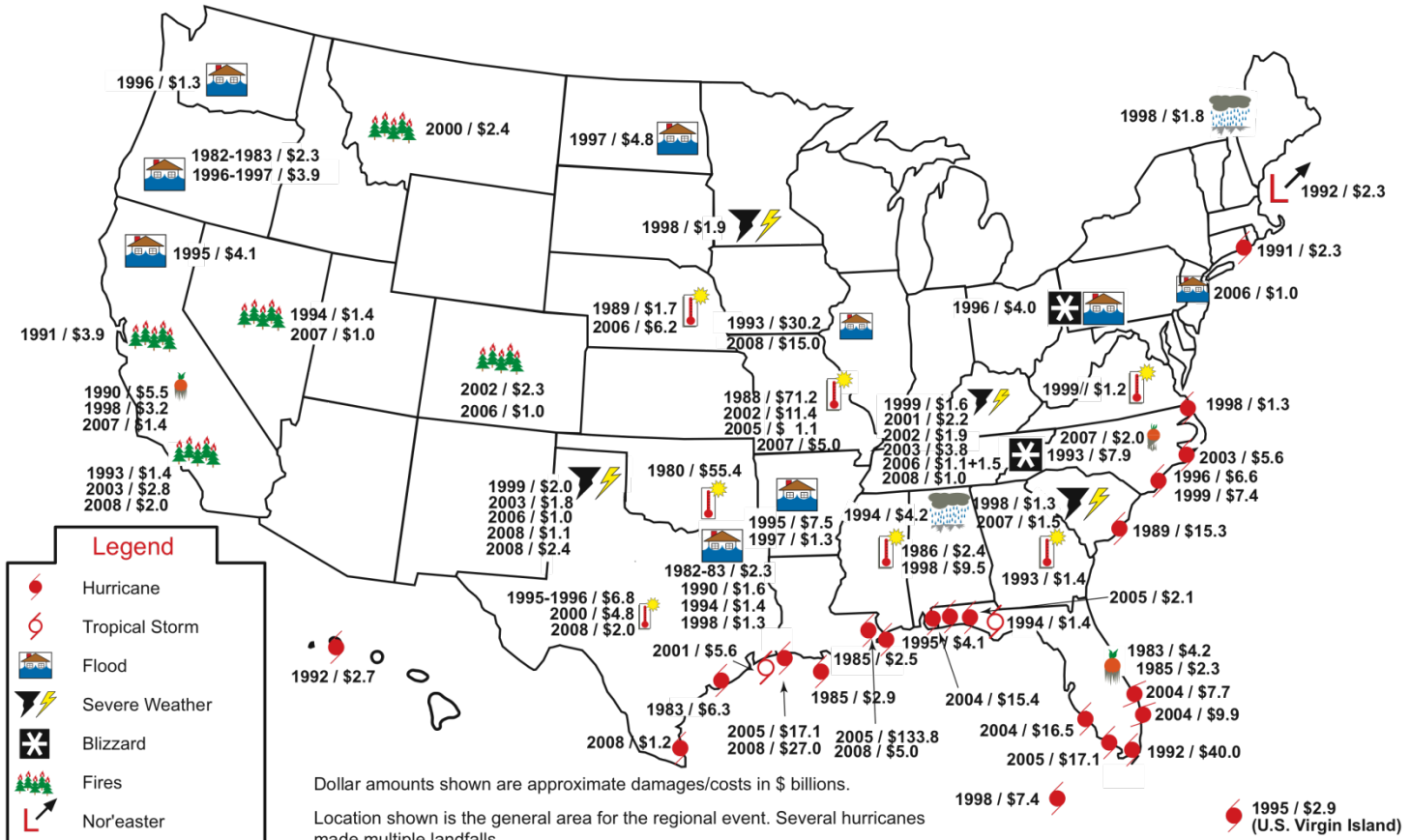
Hurricanes and Tornadoes



National Climatic Data Center

Weather Disasters

Billion Dollar Weather Disasters 1980 - 2008



Dollar amounts shown are approximate damages/costs in $ billions.

Location shown is the general area for the regional event. Several hurricanes made multiple landfalls.

Additional information for these events is available at NCDC WWW site www.ncdc.noaa.gov/ol/reports/billionz.html

The U.S. has sustained 90 weather related disasters over the last 29 years with overall damages/costs exceeding $1.0 billion for each event. Total costs for the 90 events exceed $700 billion using a GNP inflation index.

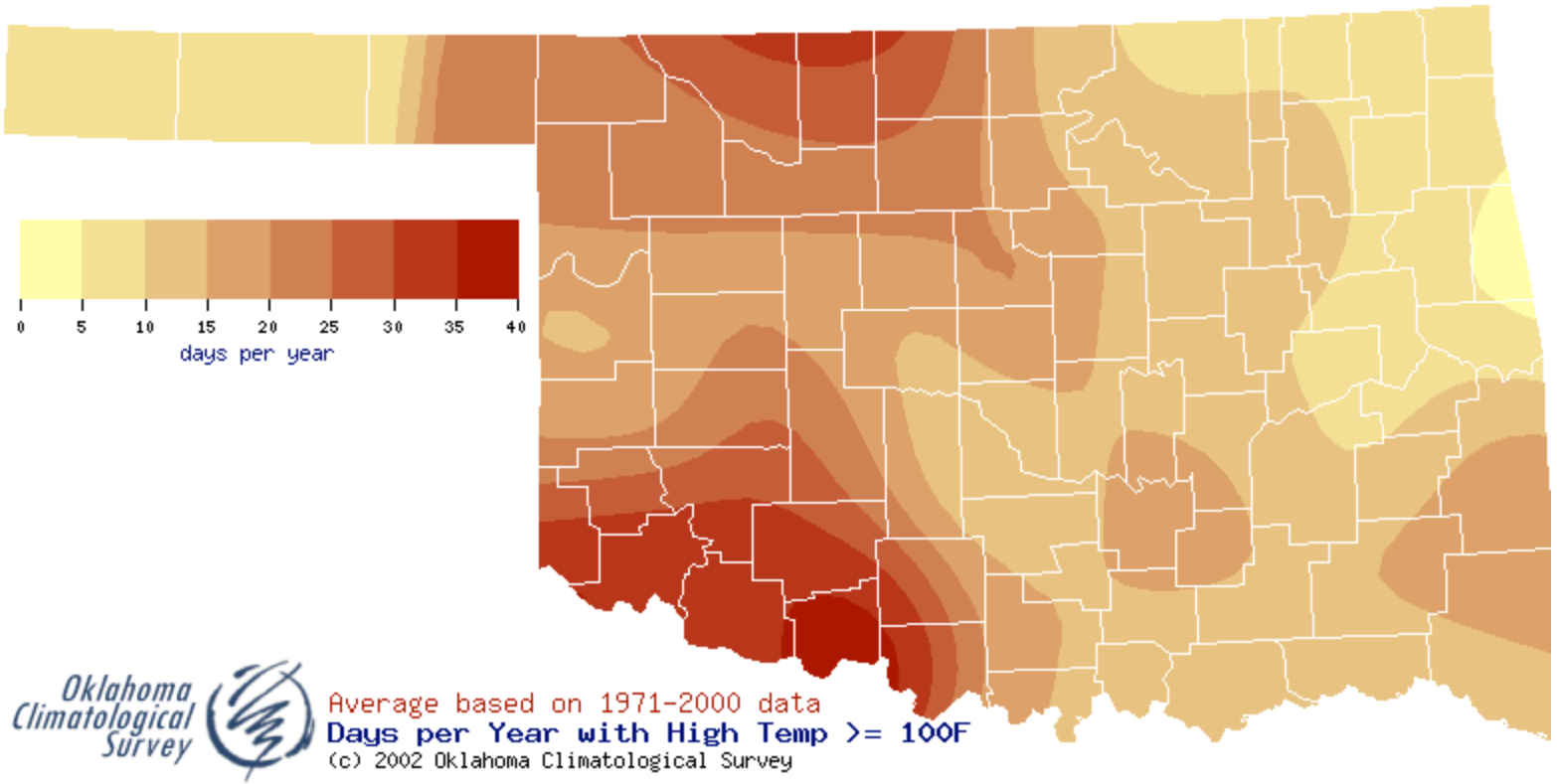
NOAA's
National Climatic Data Center

Oklahoma Climate Survey

http://climate.ocs.ou.edu

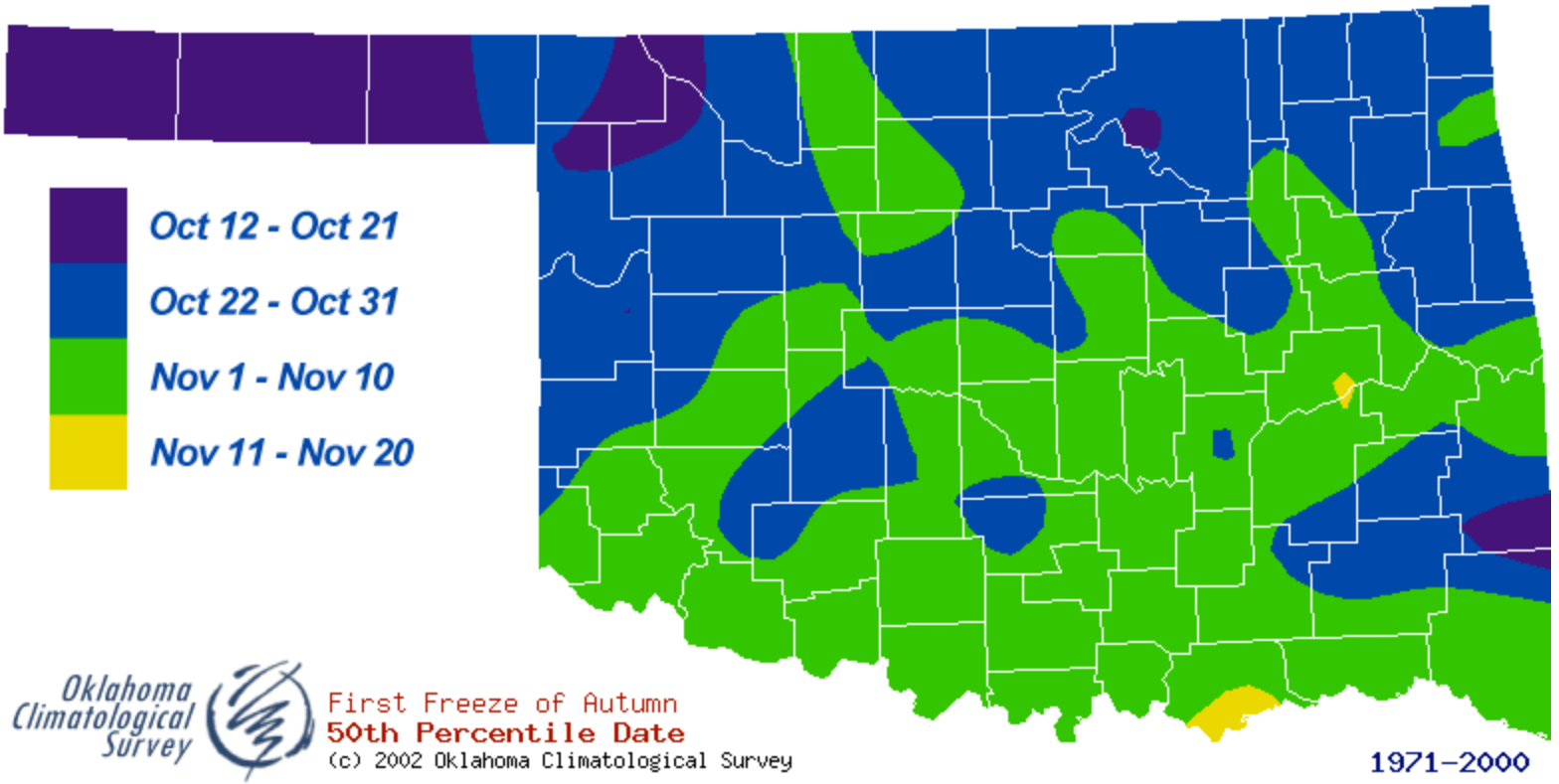
Normals & Extremes

Days over 100 degrees



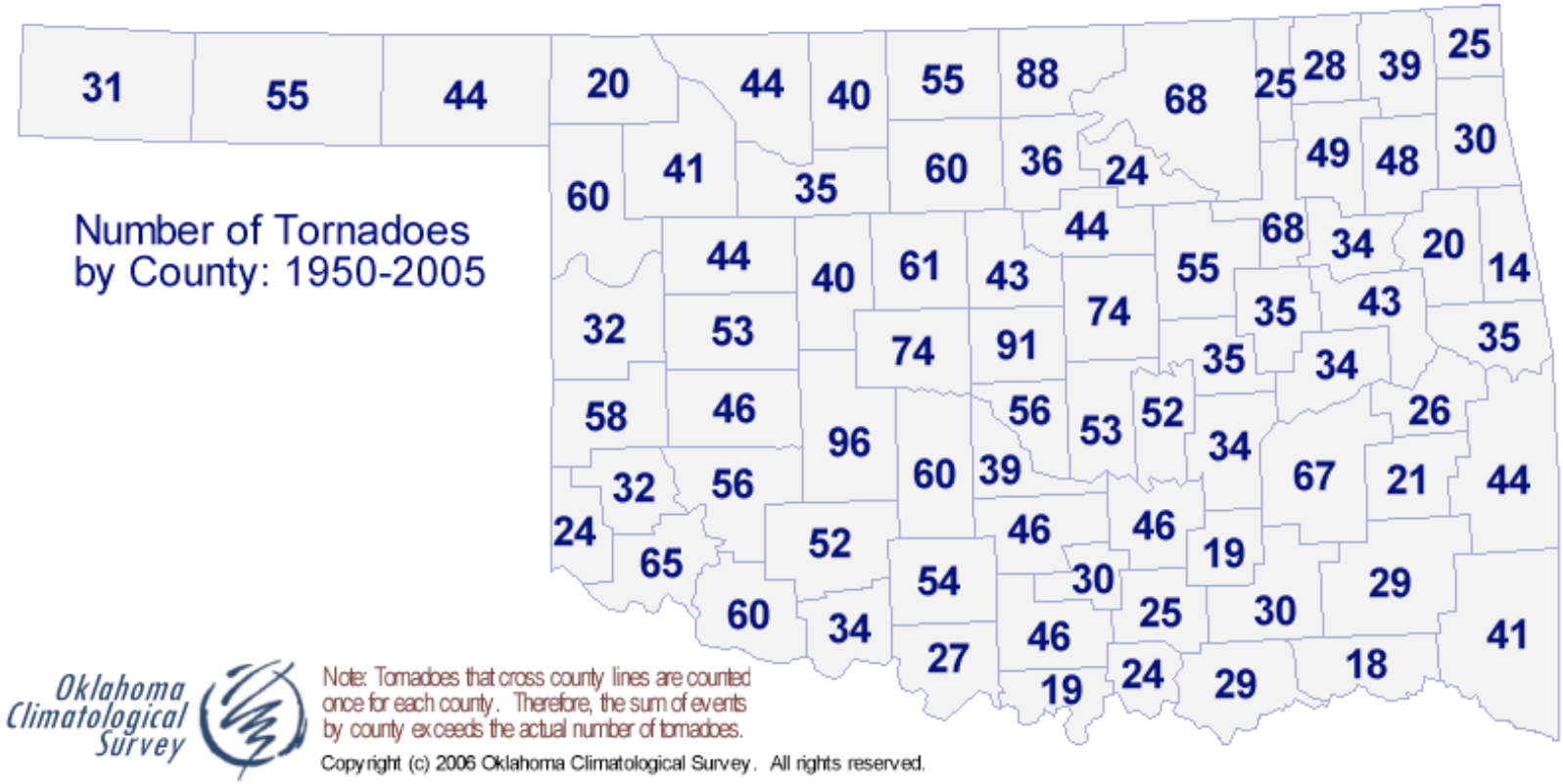
Normals & Extremes

First Freeze of Autumn

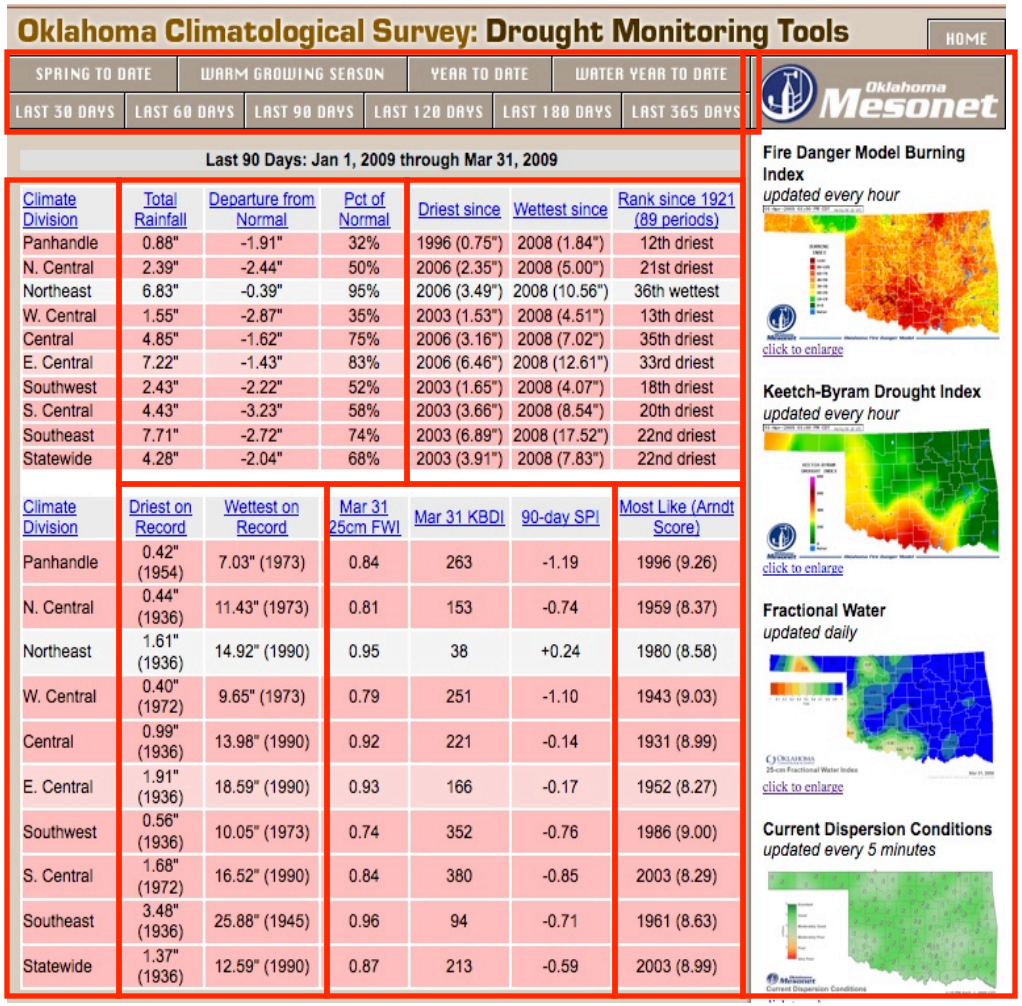


Normals & Extremes

Tornadoes by county



Rainfall and Drought Update



Oklahoma Climatological Survey: Drought Monitoring Tools

HOME

SPRING TO DATE | WARM GROWING SEASON | YEAR TO DATE | WATER YEAR TO DATE

LAST 30 DAYS | LAST 60 DAYS | LAST 90 DAYS | LAST 120 DAYS | LAST 180 DAYS | LAST 365 DAYS

Oklahoma Mesonet

Last 90 Days: Jan 1, 2009 through Mar 31, 2009

Climate Division	Total Rainfall	Departure from Normal	Pct of Normal	Driest since	Wettest since	Rank since 1921 (89 periods)
Panhandle	0.88"	-1.91"	32%	1996 (0.75")	2008 (1.84")	12th driest
N. Central	2.39"	-2.44"	50%	2006 (2.35")	2008 (5.00")	21st driest
Northeast	6.83"	-0.39"	95%	2006 (3.49")	2008 (10.56")	36th wettest
W. Central	1.55"	-2.87"	35%	2003 (1.53")	2008 (4.51")	13th driest
Central	4.85"	-1.62"	75%	2006 (3.16")	2008 (7.02")	35th driest
E. Central	7.22"	-1.43"	83%	2006 (6.46")	2008 (12.61")	33rd driest
Southwest	2.43"	-2.22"	52%	2003 (1.65")	2008 (4.07")	18th driest
S. Central	4.43"	-3.23"	58%	2003 (3.66")	2008 (8.54")	20th driest
Southeast	7.71"	-2.72"	74%	2003 (6.89")	2008 (17.52")	22nd driest
Statewide	4.28"	-2.04"	68%	2003 (3.91")	2008 (7.83")	22nd driest

Climate Division	Driest on Record	Wettest on Record	Mar 31 25cm FWI	Mar 31 KBDI	90-day SPI	Most Like (Arndt Score)
Panhandle	0.42" (1954)	7.03" (1973)	0.84	263	-1.19	1996 (9.26)
N. Central	0.44" (1936)	11.43" (1973)	0.81	153	-0.74	1959 (8.37)
Northeast	1.61" (1936)	14.92" (1990)	0.95	38	+0.24	1980 (8.58)
W. Central	0.40" (1972)	9.65" (1973)	0.79	251	-1.10	1943 (9.03)
Central	0.99" (1936)	13.98" (1990)	0.92	221	-0.14	1931 (8.99)
E. Central	1.91" (1936)	18.59" (1990)	0.93	166	-0.17	1952 (8.27)
Southwest	0.56" (1936)	10.05" (1973)	0.74	352	-0.76	1986 (9.00)
S. Central	1.68" (1972)	16.52" (1990)	0.84	380	-0.85	2003 (8.29)
Southeast	3.48" (1936)	25.88" (1945)	0.96	94	-0.71	1961 (8.63)
Statewide	1.37" (1936)	12.59" (1990)	0.87	213	-0.59	2003 (8.99)

Fire Danger Model Burning Index
updated every hour

click to enlarge

Keetch-Byram Drought Index
updated every hour

click to enlarge

Fractional Water
updated daily

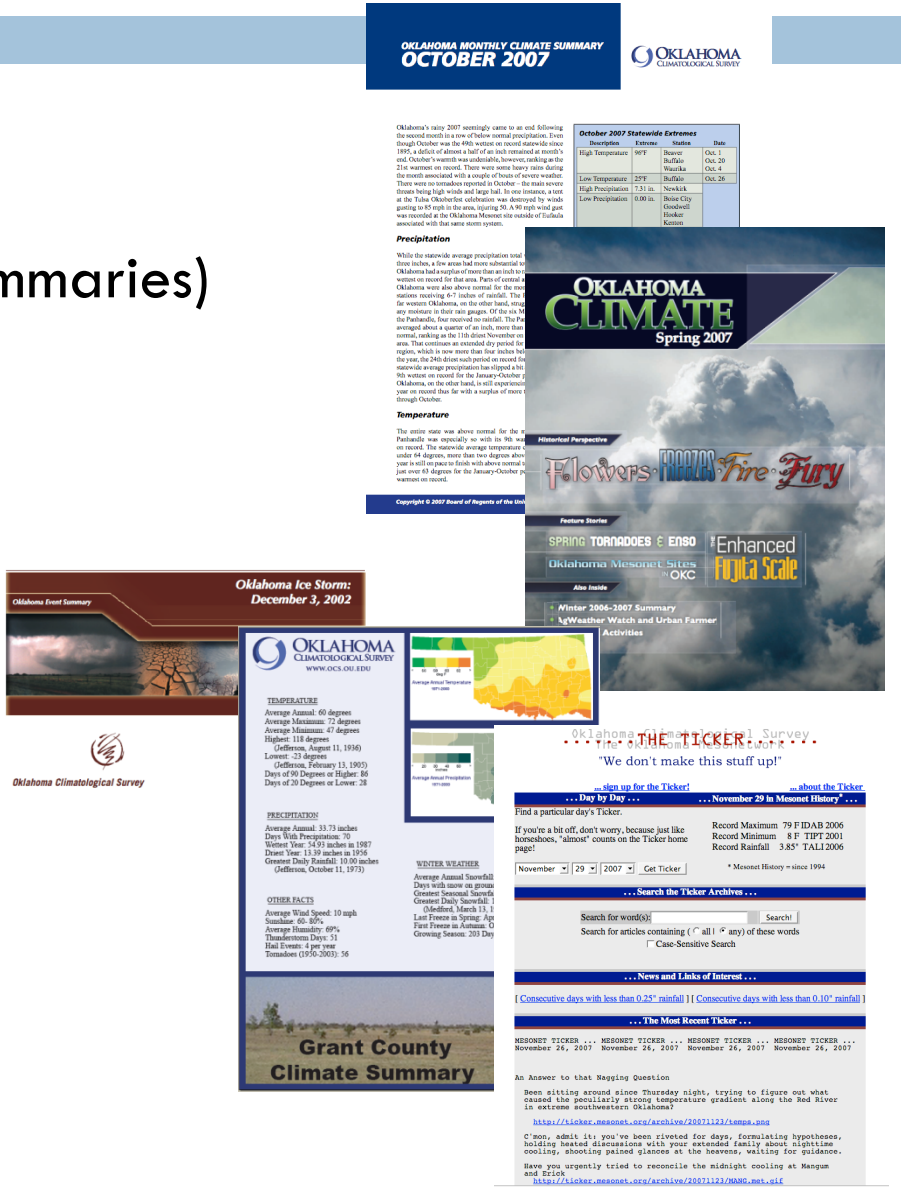
click to enlarge

Current Dispersion Conditions
updated every 5 minutes

- Choose from ten drought "seasons"
- Sorted by climate division
- Basic statistics
- Historical perspective & rankings
- "Specialized" indices
- Analog years ("most like current season")
- Related fire danger and smoke management products

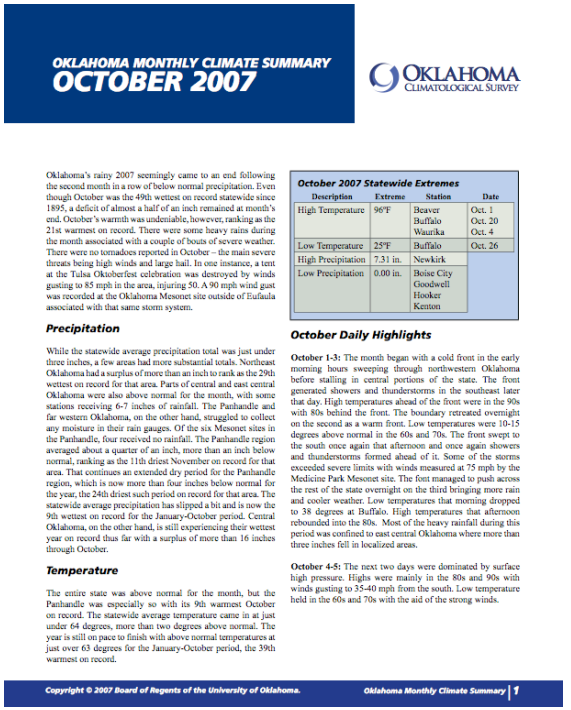
OCS Publications

- Monthly Summaries
- *Oklahoma Climate* (Seasonal Summaries)
- Climate Event Summaries
  - Ice Storm
  - Tornado
  - Drought
- County Climate Summaries
- OCS/Mesonet Ticker



OCS Publications—Monthly Summary

- http://climate.mesonet.org/monthly_summary.html
- Overview and daily highlights
- Severe weather reports
- Statewide maps of precipitation, temperature, departures from normal, and soil moisture
- Mesonet station summaries
- Climate division comparisons (OK is divided into 9 regions, assuming similar climates within each region)
- Next month's outlook
- Drought Monitor and Outlook; seasonal forecast



OKLAHOMA MONTHLY CLIMATE SUMMARY
OCTOBER 2007

OKLAHOMA CLIMATOLOGICAL SURVEY

Oklahoma's rainy 2007 seemingly came to an end following the second month in a row of below normal precipitation. Even though October was the 49th wettest on record statewide since 1895, a deficit of almost a half of an inch remained at month's end, October's warmth was undeniable, however, ranking as the 21st warmest on record. There were some heavy rains during the month associated with a couple of bouts of severe weather. There were no tornadoes reported in October – the main severe threats being high winds and large hail. In one instance, a tent at the Tulsa Oktoberfest celebration was destroyed by winds gusting to 85 mph in the area, injuring 50. A 90 mph wind gust was recorded at the Oklahoma Mesonet site outside of Eufaula associated with that same storm system.

October 2007 Statewide Extremes

Description	Extreme	Station	Date
High Temperature	96°F	Beaver Buffalo Waurika	Oct. 1 Oct. 20 Oct. 4
Low Temperature	25°F	Buffalo	Oct. 26
High Precipitation	7.31 in.	Newkirk	
Low Precipitation	0.00 in.	Boise City Goodwell Hooker Kenton	

Precipitation

While the statewide average precipitation total was just under three inches, a few areas had more substantial totals. Northeast Oklahoma had a surplus of more than an inch to rank as the 29th wettest on record for that area. Parts of central and east central Oklahoma were also above normal for the month, with some stations receiving 6-7 inches of rainfall. The Panhandle and far western Oklahoma, on the other hand, struggled to collect any moisture in their rain gauges. Of the six Mesonet sites in the Panhandle, four received no rainfall. The Panhandle region averaged about a quarter of an inch, more than an inch below normal, ranking as the 11th driest November on record for that area. That continues an extended dry period for the Panhandle region, which is now more than four inches below normal for the year, the 24th driest such period on record for that area. The statewide average precipitation has slipped a bit and is now the 9th wettest on record for the January-October period. Central Oklahoma, on the other hand, is still experiencing their wettest year on record thus far with a surplus of more than 16 inches through October.

Temperature

The entire state was above normal for the month, but the Panhandle was especially so with its 9th warmest October on record. The statewide average temperature came in at just under 64 degrees, more than two degrees above normal. The year is still on pace to finish with above normal temperatures at just over 63 degrees for the January-October period, the 39th warmest on record.

October Daily Highlights

October 1-3: The month began with a cold front in the early morning hours sweeping through northwestern Oklahoma before stalling in central portions of the state. The front generated showers and thunderstorms in the southeast later that day. High temperatures ahead of the front were in the 90s with 80s behind the front. The boundary retreated overnight on the second as a warm front. Low temperatures were 10-15 degrees above normal in the 60s and 70s. The front swept to the south once again that afternoon and once again showers and thunderstorms formed ahead of it. Some of the storms exceeded severe limits with winds measured at 75 mph by the Medicine Park Mesonet site. The font managed to push across the rest of the state overnight on the third bringing more rain and cooler weather. Low temperatures that morning dropped to 38 degrees at Buffalo. High temperatures that afternoon rebounded into the 80s. Most of the heavy rainfall during this period was confined to east central Oklahoma where more than three inches fell in localized areas.

October 4-5: The next two days were dominated by surface high pressure. Highs were mainly in the 80s and 90s with winds gusting to 35-40 mph from the south. Low temperature held in the 60s and 70s with the aid of the strong winds.

OCS Publications—Seasonal Summary

- http://climate.mesonet.org/seasonal_summary.html
- *Oklahoma Climate*
- Published in March, June, September, December
- Built around a theme (e.g., fall weather)
  - Historical perspective of Oklahoma climate or event
  - Feature articles on OCS outreach, research, climate services, etc.
  - Photos from the field
  - Seasonal summary
  - Agriculture articles
  - Classroom activity/interpretation

OCS Publications—Event Summaries

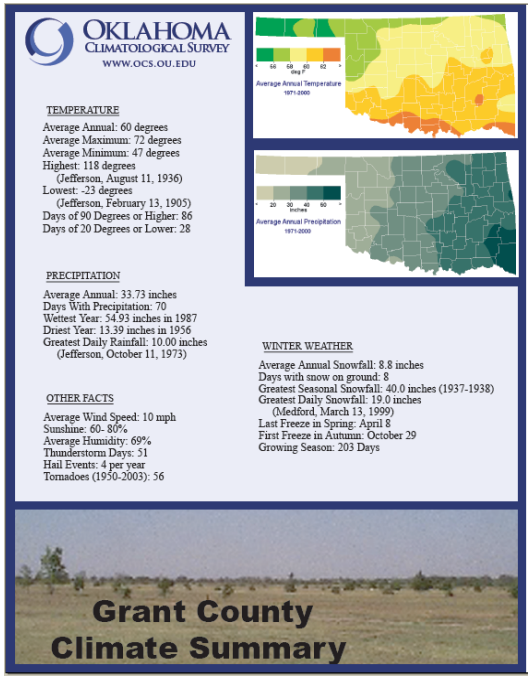
- http://climate.mesonet.org/event_summary.html

- Overview of federally-declared disasters
  - The meteorology of the event
  - Impacts
  - Historical perspective

- Climate Event Summaries have been prepared for:
  - January 28-30, 2002: Oklahoma Ice Storm
  - The Oklahoma Drought of 2001-2002
  - Oklahoma Ice Storm: December 3, 2002
  - May 8-9, 2003 Central Oklahoma Tornadoes

County Climate Summaries

- Historical summaries for each county
- Quick Facts 1-page overview of normals & extremes
- PDF summary and tables for county, including month-by-month temperatures, rainfall, snowfall, tornado records, etc.
- Station summaries for Coop and Mesonet sites
  - All long-term stations within county listed
  - Similar tables to PDF summary, but for each site
  - Includes ranges of "likely" conditions; not just monthly averages
  - Freeze/Frost dates for each site



Weather Timeline

Time Line 1980-1989

1980: Oklahoma Climatological Survey established at the University of Oklahoma.

1980 Summer heat wave: daily maximum temperature at Oklahoma City exceeded 100 degrees 50 times during the season.

1980 Driest July of century with a statewide-averaged precipitation of 0.41 inch.

1981 October 10-17: Remnants of Hurricane Norma produce as much as 18 inches of rain in 36 hours in south central Oklahoma (Kingston-Madill-Tishomingo).

1982: 101 tornadoes, 3rd most in one year since 1950.

1983 October 17-23: Remnants of Hurricane Tico produce up to 10-15 inches of rain, extensive flooding, from Rush Springs to Shawnee. Damages estimated at $84M, including $77M to agriculture.

1983: 92 tornadoes, 5th most in one year since 1950.

1982-1983: 193 tornadoes, 2nd greatest number of tornadoes in consecutive years.

1983 Coldest April of century with a statewide-averaged temperature of 54.0 degrees.

1983 Coldest December of century with a statewide averaged temperature of 26.5 degrees. Oklahoma City temperature did not exceed freezing from 17th through the 31st.

1984 May 26-27: Tulsa Memorial Day flood – more than 12 inches of rain overnight, subsequent flooding left 14 dead, destroyed or damaged 5,500 homes and over 7,000 vehicles. In reaction to this disaster, Tulsa launched a massive flood prevention and warning system that remains among the most effective public safety programs in the nation.

1984 Wettest December of century with a statewide-averaged precipitation of 4.98 inches.

1986 Driest January of century with a statewide averaged precipitation of 0.04 inches.

1986 September 30-October 4: Remnants of Hurricane Paine produce rains of around 10 inches in western and central Oklahoma and as much as 20 inches in north central Oklahoma. Major flooding on Arkansas River and its tributaries. Flooding was reported in 52 counties, damages estimated at $350M, half of that to agriculture.

1987 May 29-30: Intense thunderstorm producing 5 to 11 inches of rain produced flash flooding in Chickasha, Lindsey, and Pauls Valley.

1987 mid-December through early January 1988: Series of winter storms. December 13-15: 8 to 14 inches of snow over northwest half of state, drifting up to 4 feet. December 25-27: Intense ice storm along 40-mile-wide stretch from Duncan to Norman to Tulsa and on to Miami left 75,000 homes without power, one-third of those for as long as a week. Ice accumulations of one to two inches on power lines and trees led to $10M in damages. Flooding occurred on rivers just southeast of the ice storm. January 5-7, 1988: Heavy snow – 10 inches over much of the state with some areas receiving 16 to 18 inches. Rooftop drifts of two to three feet caused extensive damage.

1988: 17 tornadoes, fewest in one year during 1950-1999 period.

1988 Driest May of century with a statewide-averaged precipitation of 1.30 inches.

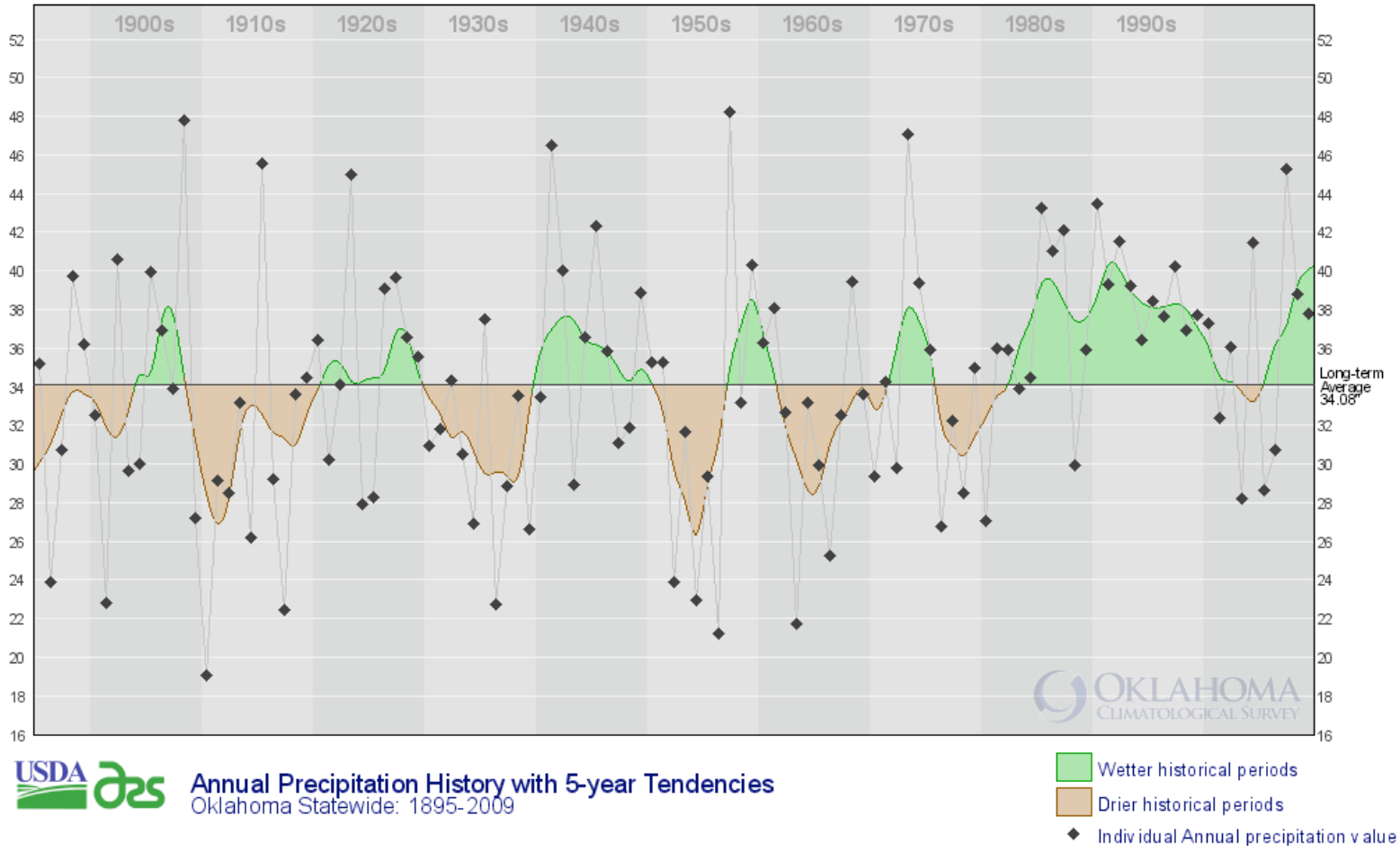
1989 Driest April of century with a statewide-averaged precipitation of 0.58 inch.

1988-89: 37 tornadoes, fewest in consecutive years since 1950.

1989 Cold outbreak March 3, temperatures fall over 50 degrees in a few hours, severe thunderstorms form over the cold air.

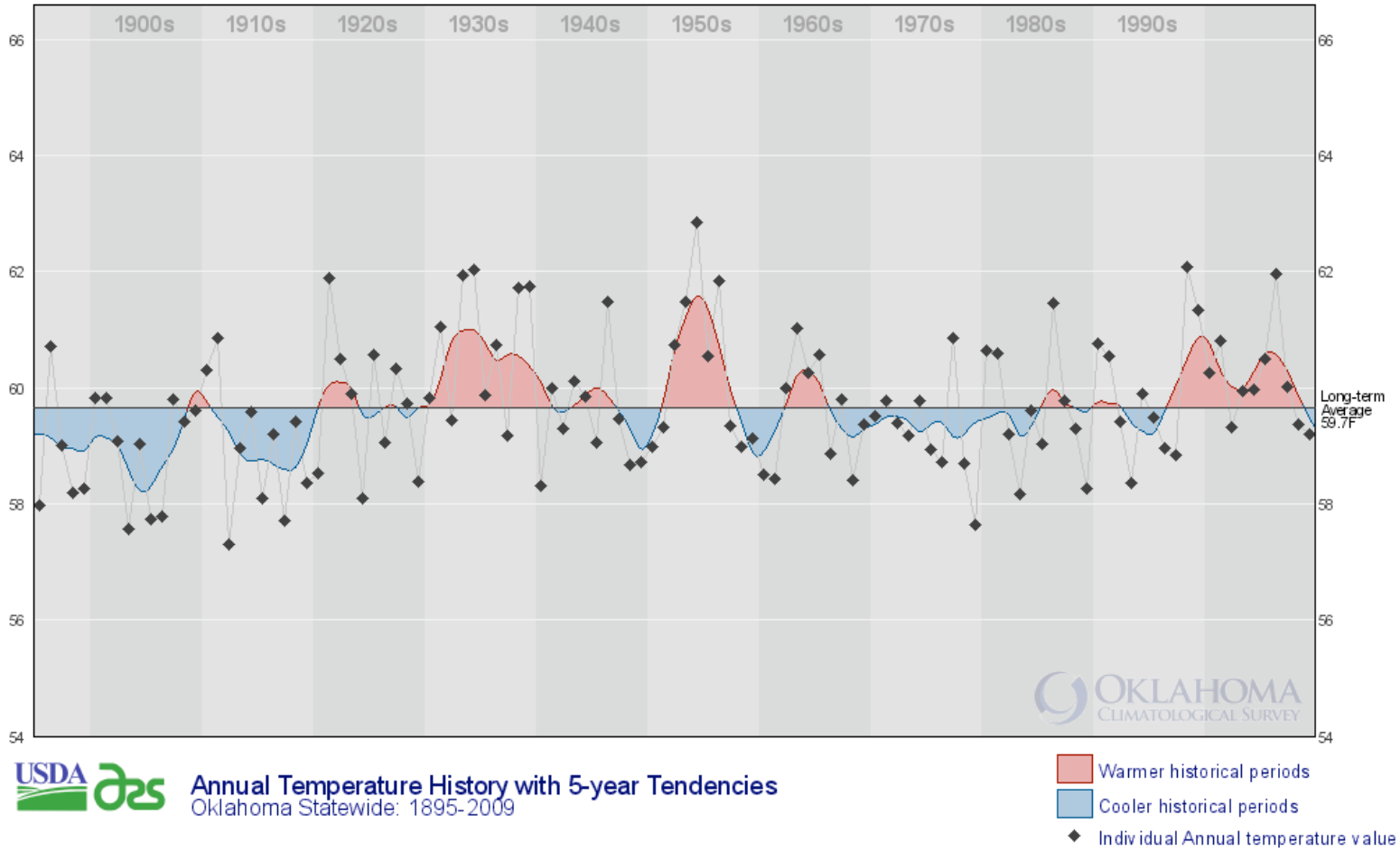
Climate Trends

Annual Precipitation, 1895-2009



Climate Trends

Annual Temperature, 1895-2009



Cooperative Observer Data

Time Series

JEFFERSON
Grant County, North Central Climate Division (CD 2)
36.72 N, 97.78 W, 1044 ft.

August 2000	TMAX (F)	TMIN (F)	PRCP (in)
Aug 1, 2000	90	61	
Aug 2, 2000	94	62	
Aug 3, 2000	95	63	
Aug 4, 2000	97	70	
Aug 5, 2000	104	74	
Aug 6, 2000	103	74	
Aug 7, 2000	103	75	
Aug 8, 2000	106	77	
Aug 9, 2000	106	77	
Aug 10, 2000	103	73	
Aug 11, 2000	101	74	
Aug 12, 2000	104	73	
Aug 13, 2000	104	72	
Aug 14, 2000	106	71	
Aug 15, 2000	100	68	
Aug 16, 2000	103	67	
Aug 17, 2000	103	71	
Aug 18, 2000	102	66	
Aug 19, 2000	88	64	0.19
Aug 20, 2000	105	67	
Aug 21, 2000	103	69	
Aug 22, 2000	105	69	
Aug 23, 2000	104	72	

JEFFERSON
Grant County, North Central Climate Division (CD 2)
36.72 N, 97.78 W, 1044 ft.

2000	TAVG (F)	TMAX (F)	TMIN (F)	PRCP (in)	SNOW (in)
Jan 2000	37.4	50.0	24.7	0.56	8.0
Feb 2000	45.8	59.7	31.8	1.84	0.0
Mar 2000	n/a	65.0	n/a	6.27	n/a
Apr 2000	59.1	73.7	44.6	1.70	0.0
May 2000	71.6	85.3	58.0	3.24	0.0
Jun 2000	75.8	88.4	63.2	3.84	0.0
Jul 2000	n/a	96.0	n/a	2.71	0.0
Aug 2000	86.7	102.6	70.8	0.19	0.0
Sep 2000	74.8	92.7	57.0	0.02	0.0
Oct 2000	62.9	75.2	50.5	4.81	0.0
Nov 2000	41.4	53.5	29.2	2.25	0.0
Dec 2000	27.2	38.6	15.7	1.17	n/a

Cooperative Observer Data

A Month in Time

August 2000						
Sunday	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
Monthly Data: Avg High: 103 Avg Low: 71 Avg Temp: 87	**Monthly Data:** Precip: 0.19 Snow: None	**1** Max Temp: 90 Min Temp: 61 Precip: 0.00	**2** Max Temp: 94 Min Temp: 62 Precip: 0.00	**3** Max Temp: 95 Min Temp: 63 Precip: 0.00	**4** Max Temp: 97 Min Temp: 70 Precip: 0.00	**5** Max Temp: 104 Min Temp: 74 Precip: 0.00
6 Max Temp: 103 Min Temp: 74 Precip: 0.00	**7** Max Temp: 103 Min Temp: 75 Precip: 0.00	**8** Max Temp: 106 Min Temp: 77 Precip: 0.00	**9** Max Temp: 106 Min Temp: 77 Precip: 0.00	**10** Max Temp: 103 Min Temp: 73 Precip: 0.00	**11** Max Temp: 101 Min Temp: 74 Precip: 0.00	**12** Max Temp: 104 Min Temp: 73 Precip: 0.00
13 Max Temp: 104 Min Temp: 72 Precip: 0.00	**14** Max Temp: 106 Min Temp: 71 Precip: 0.00	**15** Max Temp: 100 Min Temp: 68 Precip: 0.00	**16** Max Temp: 103 Min Temp: 67 Precip: 0.00	**17** Max Temp: 103 Min Temp: 71 Precip: 0.00	**18** Max Temp: 102 Min Temp: 66 Precip: 0.00	**19** Max Temp: 88 Min Temp: 64 Precip: 0.19
20 Max Temp: 105 Min Temp: 67 Precip: 0.00	**21** Max Temp: 103 Min Temp: 69 Precip: 0.00	**22** Max Temp: 105 Min Temp: 69 Precip: 0.00	**23** Max Temp: 104 Min Temp: 72 Precip: 0.00	**24** Max Temp: 104 Min Temp: 72 Precip: 0.00	**25** Max Temp: 106 Min Temp: 72 Precip: 0.00	**26** Max Temp: 107 Min Temp: 72 Precip: 0.00
27 Max Temp: 110 Min Temp: 75 Precip: 0.00	**28** Max Temp: 110 Min Temp: 75 Precip: 0.00	**29** Max Temp: 107 Min Temp: 76 Precip: 0.00	**30** Max Temp: 106 Min Temp: 71 Precip: 0.00	**31** Max Temp: 103 Min Temp: 72 Precip: 0.00	**Key:** All Temps deg F All Precip inches	

Cooperative Observer Data

Climate Calendar

Shown as August 2005

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Periods of Record Temps 1894-2003 Precip 1894-2003 Snow 1894-2003	**1** T Avgs: 96/69 Sig Prcp Freq: 13% Extremes: High T 111 (1934) Low T 51 (1936) Precip 2.81 (1995)	**2** T Avgs: 96/69 Sig Prcp Freq: 19% Extremes: High T 110* (1918) Low T 54* (1913) Precip 3.19 (1927)	**3** T Avgs: 96/69 Sig Prcp Freq: 11% Extremes: High T 112* (1918) Low T 55 (1974) Precip 1.81 (1927)	**4** T Avgs: 95/69 Sig Prcp Freq: 17% Extremes: High T 111* (1918) Low T 52 (1894) Precip 1.00 (1911)	**5** T Avgs: 96/69 Sig Prcp Freq: 11% Extremes: High T 112 (1929) Low T 53 (1894) Precip 1.38 (1992)	**6** T Avgs: 97/69 Sig Prcp Freq: 19% Extremes: High T 114 (1964) Low T 53 (1990) Precip 5.88 (1898)
7 T Avgs: 97/69 Sig Prcp Freq: 14% Extremes: High T 110* (1933) Low T 55* (1894) Precip 1.93 (1997)	**8** T Avgs: 96/69 Sig Prcp Freq: 13% Extremes: High T 111* (1934) Low T 52 (1989) Precip 2.36 (1902)	**9** T Avgs: 96/69 Sig Prcp Freq: 14% Extremes: High T 115 (1936) Low T 54 (1989) Precip 1.34 (1955)	**10** T Avgs: 96/68 Sig Prcp Freq: 14% Extremes: High T 117 (1936) Low T 40 (1903) Precip 3.33 (1951)	**11** T Avgs: 95/68 Sig Prcp Freq: 16% Extremes: High T 118 (1936) Low T 53 (1931) Precip 2.46 (2004)	**12** T Avgs: 95/68 Sig Prcp Freq: 15% Extremes: High T 118 (1936) Low T 50 (1967) Precip 2.33 (1948)	**13** T Avgs: 95/68 Sig Prcp Freq: 17% Extremes: High T 114 (1936) Low T 52 (1967) Precip 3.20 (1989)
14 T Avgs: 95/68 Sig Prcp Freq: 17% Extremes: High T 111 (1934) Low T 54 (1991) Precip 3.12 (1949)	**15** T Avgs: 94/69 Sig Prcp Freq: 11% Extremes: High T 111* (1934) Low T 49 (1994) Precip 3.60 (1969)	**16** T Avgs: 95/69 Sig Prcp Freq: 11% Extremes: High T 110 (1956) Low T 56 (1994) Precip 2.04 (1938)	**17** T Avgs: 95/69 Sig Prcp Freq: 18% Extremes: High T 109 (1956) Low T 56 (1942) Precip 3.30 (1904)	**18** T Avgs: 94/68 Sig Prcp Freq: 11% Extremes: High T 111 (1934) Low T 46 (1943) Precip 2.60 (1968)	**19** T Avgs: 94/67 Sig Prcp Freq: 12% Extremes: High T 107 (1936) Low T 52 (1940) Precip 1.42 (1983)	**20** T Avgs: 94/67 Sig Prcp Freq: 16% Extremes: High T 111 (1934) Low T 50* (1950) Precip 2.03 (1930)
21 T Avgs: 94/67 Sig Prcp Freq: 15% Extremes: High T 110 (1934) Low T 48 (1939) Precip 3.67 (1920)	**22** T Avgs: 93/67 Sig Prcp Freq: 19% Extremes: High T 106* (1918) Low T 50 (1949) Precip 1.91 (1907)	**23** T Avgs: 94/66 Sig Prcp Freq: 16% Extremes: High T 110 (1936) Low T 50 (1923) Precip 3.50 (1914)	**24** T Avgs: 94/66 Sig Prcp Freq: 10% Extremes: High T 110 (1936) Low T 48 (1896) Precip 0.80 (1930)	**25** T Avgs: 94/66 Sig Prcp Freq: 10% Extremes: High T 109 (1936) Low T 51* (1896) Precip 3.40 (1960)	**26** T Avgs: 95/67 Sig Prcp Freq: 7% Extremes: High T 109* (1913) Low T 46 (1910) Precip 2.15 (1960)	**27** T Avgs: 93/67 Sig Prcp Freq: 11% Extremes: High T 110 (2000) Low T 48 (1910) Precip 0.50 (2002)
28 T Avgs: 93/66 Sig Prcp Freq: 8% Extremes: High T 110 (2000) Low T 47 (1916) Precip 2.20 (1974)	**29** T Avgs: 93/65 Sig Prcp Freq: 14% Extremes: High T 109 (1984) Low T 45 (1911) Precip 3.20 (1897)	**30** T Avgs: 93/66 Sig Prcp Freq: 15% Extremes: High T 110 (1939) Low T 44 (1915) Precip 4.45 (2003)	**31** T Avgs: 92/66 Sig Prcp Freq: 18% Extremes: High T 110 (1912) Low T 41 (1915) Precip 4.10 (2003)	**Key** * - Record since tied Highlight = Aug record All Temps in deg F All Precip in inches Sig Prcp Freq = Pct of days with >= 0.1" precip	**Aug. Averages** High Temp 95 F Low Temp 68 F Avg Temp 82 F Precip 3.17" Snow 0.0"	

Cooperative Observer Data

CLIMOCS (long-term summaries)

JEFFERSON: Climatological Summary

Location: Grant County, 36.72 N 97.78 W

click here for help

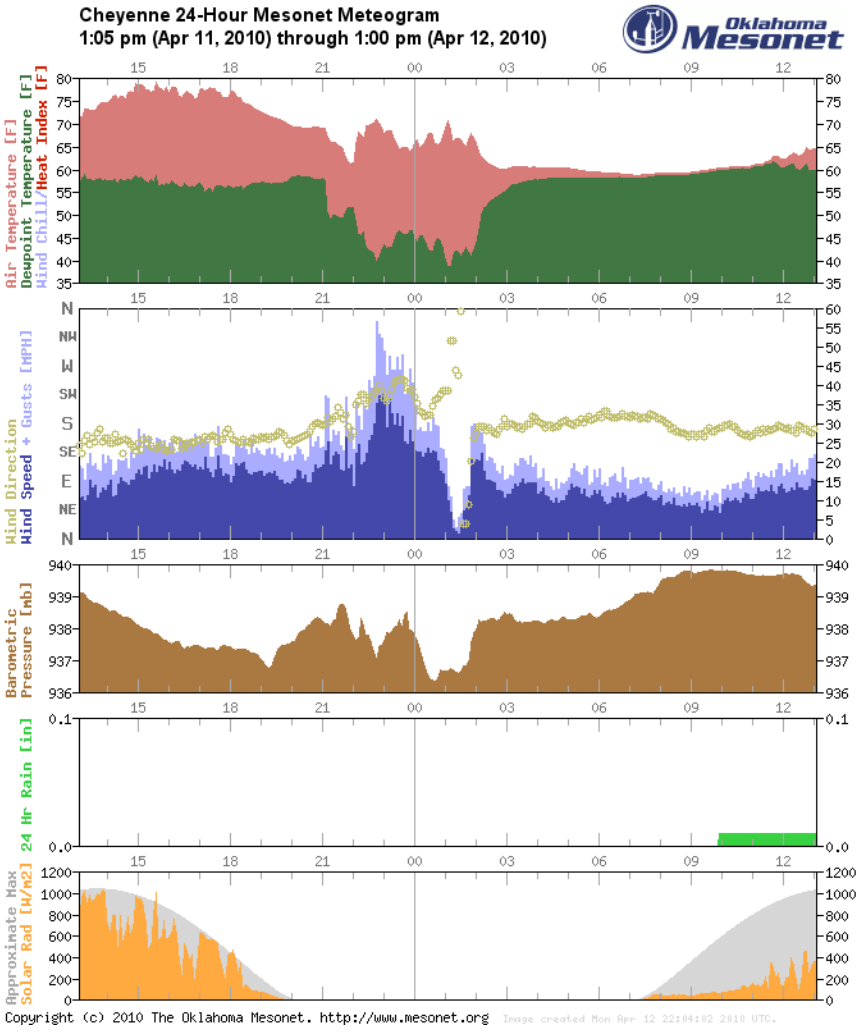
Temperature (deg Fahrenheit)												
	AVERAGES (1971-2000)			EXTREMES (1894-2004)				AVG # DAYS PER MONTH (1971-2000)				
	Daily Max	Daily Min	Daily Avg	Record High		Record Low		Max>100	Max>90	Max<32	Min<32	Min<0
Jan	46.3	22.9	34.6	85	(31st, 1911)	-22	(28th, 1899)			5	26	1
Feb	53.0	27.7	40.4	92	(22nd, 1996)	-23	(13th, 1905)		*	3	19	1
Mar	62.7	36.5	49.6	98	(31st, 1940)	-4	(3rd, 1960)		*	*	12	
Apr	72.5	45.7	59.1	102	(12th, 1972)	17	(9th, 1914)	*	1		3	
May	81.0	56.0	68.5	107	(31st, 1934)	25	(1st, 1909)	*	4		*	
Jun	91.1	65.3	78.2	114	(15th, 1953)	42	(4th, 1897)	3	19			
Jul	96.3	70.0	83.1	117	(18th, 1936)	44	(20th, 1899)	10	26			
Aug	95.1	68.4	81.8	118	(11th, 1936)	40	(10th, 1903)	9	25			
Sep	86.5	60.2	73.3	111	(2nd, 1939)	27	(30th, 1984)	2	12		*	
Oct	75.1	48.3	61.7	102	(2nd, 1898)	11	(30th, 1917)		2		2	
Nov	59.3	35.6	47.5	89	(6th, 1945)	2	(17th, 1894)			*	12	
Dec	48.7	26.0	37.3	86	(24th, 1955)	-16	(23rd, 1989)			3	24	1
Annual	72.4	47.0	59.7	118	(Aug 11, 1936)	-23	(Feb 13, 1905)	25	90	11	97	2

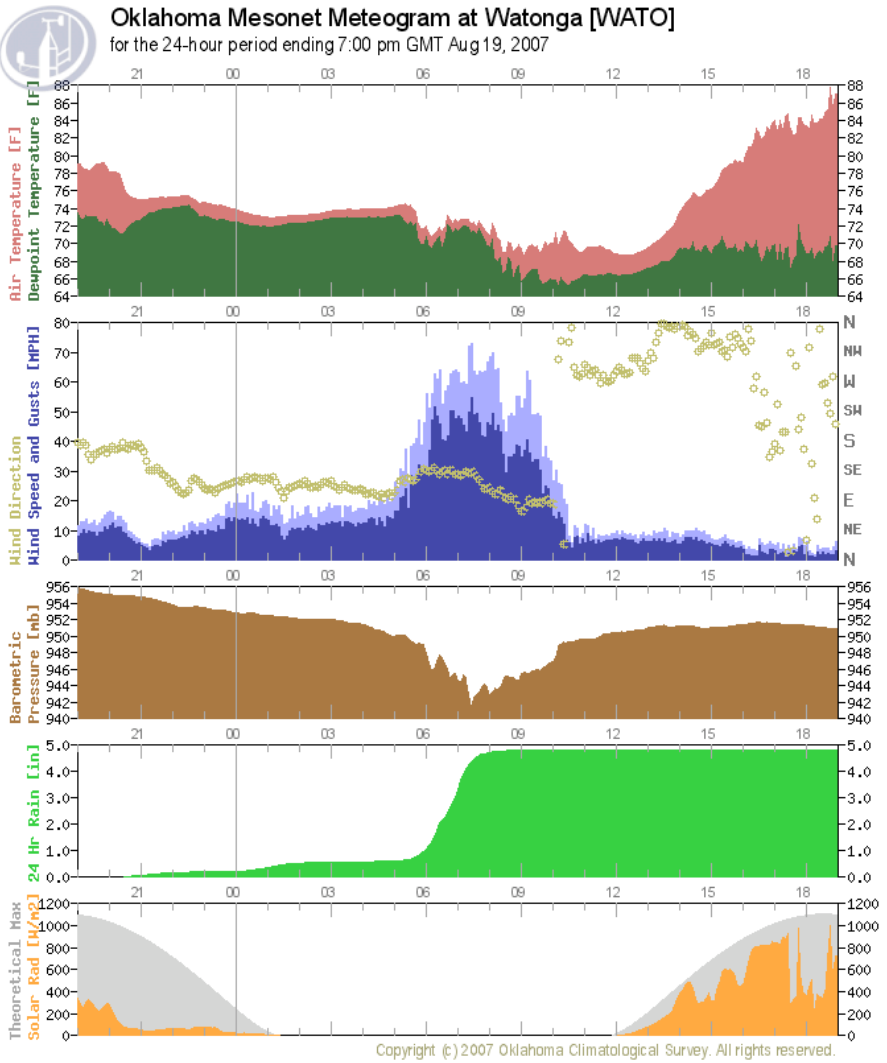
Precipitation (inches)										
	AVERAGE	EXTREMES (1894-2004)			AVG # DAYS PER MONTH (1971-2000)					
	1971-2000	Monthly Max		Daily Max		any	meas	0.10"+	0.25"+	0.50"+	1.00"+
Jan	1.03"	4.87"	(1949)	1.74"	(19th, 1894)	6	3	2	1	1	*
Feb	1.30"	4.32"	(1915)	3.09"	(21st, 1997)	5	4	3	1	1	*
Mar	3.03"	10.23"	(1973)	3.50"	(10th, 1974)	7	6	5	4	2	1
Apr	3.16"	7.66"	(1994)	4.48"	(28th, 1994)	8	7	5	4	2	1

Oklahoma Mesonet

www.mesonet.org

Oklahoma Mesonet - Meteograms





Mesonet Climatological Data

MESONET CLIMATOLOGICAL DATA SUMMARY — July 2009 — Time Zone: Midnight-Midnight CST
(FREE) Freedom — Nearest City: 3.0 SSW Freedom — County: Woodward
Latitude: 36-43-32 — Longitude: 99-08-32 — Elevation: 1739 feet

DAY	TEMPERATURE (F) MAX	MIN	AVG	DEWPT	DEG DAYS HDD	CDD	HUMIDITY (%) MAX	MIN	AVG	RAIN (in)	PRESSURE (in) STN	MSL	WIND SPEED (mph) DIR	AVG	MAX	SOLAR (MJ/m2)	4" SOIL TEMPERATURES SOD	BARE	MAX	MIN
1	95	65	80.7	56.5	0	15	84	28	46	0.00	28.09	29.92	ESE	9.2	19.7	29.02	82.4	88.2	96	81
2	102	66	84.0	54.0	0	19	66	17	39	0.00	28.14	29.98	SSW	12.8	28.7	29.96	82.8	88.3	96	81
3	104	74	90.0	56.0	0	24	60	18	34	0.00	28.11	29.95	S	16.0	33.6	27.04	83.5	88.8	95	83
4	90	70	79.9	66.2	0	15	96	31	66	0.24	28.11	29.94	NNE	11.4	34.0	23.06	83.2	87.3	93	82
5	82	64	72.8	60.7	0	8	92	46	68	0.00	28.21	30.05	NNE	10.0	21.7	22.85	80.1	83.7	89	78
6	85	59	72.7	57.6	0	7	95	34	63	0.00	28.16	30.00	ESE	5.6	15.9	23.00	78.5	82.2	90	75
7	95	65	80.9	61.1	0	15	81	31	54	0.00	28.02	29.85	SSE	10.4	26.0	26.76	80.2	85.0	93	78
8	98	71	84.4	67.0	0	20	84	36	58	0.00	27.97	29.80	SE	15.9	33.2	28.00	82.2	87.4	95	81
9	107	70	89.3	62.9	0	23	85	21	47	0.00	27.99	29.82	S	16.6	36.0	29.47	83.5	88.7	96	82
10	114	80	98.6	47.2	0	32	48	9	21	0.00	28.05	29.88	SSW	18.6	43.6	24.47	83.9	90.0	96	84
11	106	80	93.2	56.0	0	28	59	17	30	0.00	28.18	30.02	W	10.5	32.4	26.05	84.7	91.4	98	85
12	110	75	94.2	51.6	0	27	52	12	26	0.00	28.16	30.00	SSW	14.3	32.6	29.83	85.0	91.5	98	85
13	107	74	91.2	60.6	0	26	89	17	41	0.00	28.08	29.91	SSW	11.5	26.1	27.41	86.3	92.8	100	86
14	111	83	95.3	53.4	0	32	42	12	26	0.00	28.00	29.83	SSW	19.1	36.0	28.99	86.6	92.8	99	87
15	99	73	84.9	62.7	0	21	77	28	49	0.02	28.17	30.01	E	13.1	35.7	22.65	86.3	91.5	97	86
16	96	68	79.5	64.4	0	17	92	34	63	0.10	28.21	30.05	ENE	12.7	45.6	25.26	84.4	87.9	94	82
17	86	64	73.7	57.9	0	10	89	28	61	0.00	28.32	30.17	ENE	8.1	31.1	18.60	81.5	84.5	89	80
18	91	57	72.7	58.7	0	9	96	29	67	0.04	28.32	30.16	W	6.1	26.3	25.91	80.3	83.1	92	76
19	95	62	78.3	58.6	0	13	92	25	57	0.00	28.24	30.08	ESE	8.3	21.8	28.48	81.1	84.4	93	76
20	98	67	83.8	62.2	0	18	92	28	52	0.23	28.01	29.84	S	15.7	51.2	21.79	81.9	85.9	92	81
21	88	66	74.6	61.7	0	12	97	31	69	0.00	28.15	29.98	NNE	10.7	24.3	24.12	80.7	83.0	90	77
22	89	59	75.7	51.4	0	9	89	20	49	0.00	28.24	30.08	SE	6.5	18.9	29.81	80.0	83.8	93	75
23	95	61	80.1	52.7	0	13	78	22	42	0.01	28.19	30.03	S	9.1	23.5	29.29	80.9	85.5	94	77
24	100	69	86.0	56.7	0	20	75	18	41	0.00	28.10	29.94	S	11.0	24.9	29.57	82.5	87.8	96	80
25	100	70	84.5	60.3	0	20	88	23	47	0.01	28.11	29.95	E	12.5	34.9	27.97	83.5	89.1	96	82
26	91	69	79.1	64.7	0	15	96	37	65	0.03	28.20	30.04	ESE	8.0	24.3	21.97	83.3	87.5	94	82
27	90	69	78.4	64.0	0	15	94	33	64	0.00	28.14	29.98	SE	9.2	26.2	22.70	83.1	87.1	94	82
28	93	66	78.2	63.2	0	15	96	31	65	0.00	28.07	29.90	NA	8.3	31.0	23.62	82.7	86.6	94	80
29	81	66	72.2	65.5	0	8	97	56	81	0.38	28.08	29.91	E	7.6	17.3	14.19	80.5	81.6	86	78
30	81	64	71.8	56.1	0	8	96	31	62	0.32	28.17	30.01	NNE	9.8	24.3	22.96	78.9	78.8	85	74
31	89	62	76.1	59.5	0	10	84	35	59	0.02	28.19	30.03	S	13.2	32.3	22.67	77.4	78.8	87	71
	96	68	81.8	59.1	<- Monthly Averages ->						28.13	29.97	S *	11.3	51.2	25.40	82.3	86.6	94	80

Temperature - Highest: 114
Lowest: 57

Degree Days - Total HDD: 0
Total CDD: 523

Rainfall: Monthly Total: 1.40 in.
Greatest 24 Hr: 0.38 in.

Humidity - Highest: 97
Lowest: 9

Number of Days With:
Tmax ≥ 90: 23
Tmax ≤ 32: 0
Tmin ≤ 32: 0
Tmin ≤ 0: 0
Rainfall ≥ 0.01 inch: 11
Rainfall ≥ 0.10 inch: 5
Avg Wind Speed ≥ 10 mph: 19
Max Wind Speed ≥ 30 mph: 15

* Denotes incomplete record

Monthly data generated on Tuesday, September 22, 2009 at 18:31 UTC

OCS/Mesonet Ticker

- http://ticker.mesonet.org

- Fun, interesting weather and climate information

- A few of the recent really funny/interesting/informational tickers:
  - January 5, 2010 – deep freeze of December 1983
  - January 12, 2010 – uncommon cold
  - January 25, 2010 – ice storm coming!
  - February 18, 2010 – once upon a midnight dreary
  - March 8, 2010 – this past winter explained
  - March 23, 2010 – spring break snow perspective
  - March 30, 2007 – winds, warm weather, and fire danger
  - April 14, 2010 – black Sunday revisited