U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data,
and Information Service

Climatography of the United States No. 20 1971-2000

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801
www.ncdc.noaa.gov

Station: MANNFORD 6 NW, OK **COOP ID: 345522**

Climate Division: OK 5 **NWS Call Sign:** **Elevation: 830 Feet** **Lat: 36˚10N** **Lon: 96˚26W**

Temperature (˚F)

	Mean (1)			Extremes										Degree Days (1) Base Temp 65		Mean Number of Days (3)					
Month	Daily Max	Daily Min	Mean	Highest Daily(2)	Year	Day	Highest Month(1) Mean	Year	Lowest Daily(2)	Year	Day	Lowest Month(1) Mean	Year	Heating	Cooling	Max >= 100	Max >= 90	Max >= 50	Max <= 32	Min <= 32	Min <= 0
Jan	47.7	25.0	36.4	80	1981	24	45.2	1990	-10+	1984	19	23.3	1979	889	0	.0	.0	15.0	4.1	24.0	.8
Feb	54.5	30.1	42.3	92	1996	22	52.7	1976	-14	1996	4	29.6	1978	643	0	.0	@	18.4	2.4	17.3	.5
Mar	64.0	39.5	51.8	96	1974	31	57.4	1974	3	1996	9	45.9	1975	415	4	.0	.2	27.1	.2	9.0	.0
Apr	73.9	48.6	61.3	102	1972	12	69.1	1981	24	1971	2	54.8	1983	163	49	.1	1.0	29.7	.0	1.5	.0
May	79.4	57.1	68.3	96	1985	30	73.1	1996	33	1973	15	62.2	1976	44	145	.0	2.0	31.0	.0	.0	.0
Jun	87.2	65.5	76.4	103	1988	30	81.0	1990	42	1974	25	72.3	1992	3	344	.7	11.9	30.0	.0	.0	.0
Jul	93.8	69.7	81.8	113	1996	6	88.3	1980	47	1971	31	77.5	1989	0	519	7.3	24.7	31.0	.0	.0	.0
Aug	93.7	67.9	80.8	112	1984	29	86.6	1980	49+	1985	26	74.2	1992	2	492	8.1	24.0	31.0	.0	.0	.0
Sep	84.6	60.5	72.6	112	2000	2	80.6	1998	31	1984	30	63.4	1974	33	260	1.8	10.7	30.0	.0	.1	.0
Oct	74.4	49.7	62.1	98	1979	8	66.0	1973	13	1993	31	55.9	1976	136	45	.0	1.5	30.8	.0	1.8	.0
Nov	60.4	38.3	49.4	88+	1980	6	58.6	1999	3	1976	29	42.8	2000	475	5	.0	.0	24.8	.1	10.4	.0
Dec	50.0	28.6	39.3	80	1966	7	44.2	1999	-16	1989	23	24.7	1983	797	0	.0	.0	17.3	2.2	20.5	.5
Ann	72.0	48.4	60.2	113	Jul 1996	6	88.3	Jul 1980	-16	Dec 1989	23	23.3	Jan 1979	3600	1863	18.0	76.0	316.1	9.0	84.6	1.8

\+ Also occurred on an earlier date(s)

@ Denotes mean number of days greater than 0 but less than .05

Complete documentation available from: www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

(1) From the 1971-2000 Monthly Normals

(2) Derived from station's available digital record: 1948-2001

(3) Derived from 1971-2000 serially complete daily data

Issue Date: February 2004

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Precipitation (inches)

Precipitation Totals

Month	Means/Medians(1) Mean	Means/Medians(1) Median	Extremes Highest Daily(2)	Year	Day	Highest Monthly(1)	Year	Lowest Monthly(1)	Year
Jan	1.53	1.13	2.12	1982	30	4.68	1998	.00+	1986
Feb	2.12	1.65	3.88	1985	23	6.07	1985	.30	1996
Mar	3.55	3.35	2.72	1990	11	8.48	1990	.05	1971
Apr	3.63	3.64	4.46	1998	27	7.51	1995	.06	1989
May	5.43	5.38	4.60	2000	6	11.51	1982	1.31	1996
Jun	4.28	3.90	5.47	1948	22	12.09	1995	.40	1988
Jul	2.83	2.89	3.50	1950	11	6.30	1994	.00	1980
Aug	3.45	3.26	4.85	1974	10	8.70	1977	.17	2000
Sep	4.23	3.93	7.40	1971	5	15.44	1971	.42	2000
Oct	3.58	2.69	4.14	1998	18	10.87	1998	.82	1993
Nov	3.36	2.99	5.06	1974	3	8.71	1996	.00	1989
Dec	2.18	1.74	2.14	1991	21	7.41	1984	.12	1996
Ann	40.17	39.59	7.40	Sep 1971	5	15.44	Sep 1971	.00+	Nov 1989

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	4.5	3.3	.9	.3
Feb	4.8	4.0	1.3	.3
Mar	6.8	5.7	2.5	1.1
Apr	7.2	5.7	2.5	1.0
May	9.1	7.6	3.5	1.8
Jun	7.2	6.1	3.1	1.2
Jul	5.0	4.2	2.1	1.0
Aug	5.3	4.5	2.2	1.2
Sep	6.9	5.9	2.7	1.1
Oct	5.7	4.7	2.0	1.2
Nov	5.5	4.7	2.0	1.0
Dec	5.0	3.9	1.7	.5
Ann	73.0	60.3	26.5	11.7

Precipitation Probabilities (1)

Probability that the monthly/annual precipitation will be equal to or less than the indicated amount

Monthly/Annual Precipitation vs Probability Levels
These values were determined from the incomplete gamma distribution

Month	.05	.10	.20	.30	.40	.50	.60	.70	.80	.90	.95
Jan	.00	.15	.42	.66	.91	1.19	1.51	1.90	2.44	3.32	4.18
Feb	.34	.53	.84	1.13	1.43	1.75	2.13	2.59	3.20	4.18	5.13
Mar	.60	.91	1.43	1.91	2.41	2.96	3.58	4.34	5.35	6.98	8.55
Apr	.60	.91	1.44	1.94	2.45	3.01	3.65	4.43	5.47	7.16	8.77
May	1.86	2.38	3.12	3.76	4.37	4.99	5.67	6.47	7.49	9.07	10.52
Jun	.96	1.36	1.99	2.55	3.12	3.71	4.39	5.19	6.25	7.93	9.52
Jul	.36	.71	1.19	1.59	2.00	2.43	2.91	3.49	4.25	5.46	6.61
Aug	.39	.65	1.14	1.62	2.13	2.71	3.38	4.21	5.35	7.23	9.05
Sep	.76	1.14	1.76	2.34	2.92	3.56	4.28	5.16	6.33	8.20	10.00
Oct	.64	.96	1.48	1.97	2.47	3.01	3.62	4.36	5.35	6.94	8.46
Nov	.30	.68	1.24	1.73	2.23	2.77	3.39	4.15	5.15	6.78	8.34
Dec	.23	.40	.70	1.00	1.33	1.70	2.13	2.66	3.39	4.60	5.77
Ann	28.62	30.86	33.72	35.90	37.83	39.69	41.62	43.75	46.33	50.07	53.31

\+ Also occurred on an earlier date(s)
\# Denotes amounts of a trace
@ Denotes mean number of days greater than 0 but less than .05
****** Statistics not computed because less than six years out of thirty had measurable precipitation

(1) From the 1971-2000 Monthly Normals
(2) Derived from station's available digital record: 1948-2001
(3) Derived from 1971-2000 serially complete daily data

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Snow (inches)

Snow Totals

Means/Medians (1)

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median
Jan	3.2	1.4	#	0
Feb	2.3	.8	#	0
Mar	.9	.0	#	0
Apr	.0	.0	0	0
May	.0	.0	0	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.0	.0	0	0
Oct	#	.0	0	0
Nov	.2	.0	#	0
Dec	2.1	.5	#	0
Ann	8.7	2.7	N/A	N/A

Extremes (2)

Month	Highest Daily Snow Fall	Year	Day	Highest Monthly Snow Fall	Year	Highest Daily Snow Depth	Year	Day	Highest Monthly Mean Snow Depth	Year
Jan	6.5	1987	18	11.5	1979	10	1988	7	2	1979
Feb	7.5	1982	12	10.0	1978	5	1980	8	1	1980
Mar	6.5	1999	14	7.5+	1995	1	1975	4	#+	1989
Apr	.0	0	0	.0	0	0	0	0	0	0
May	.0	0	0	.0	0	0	0	0	0	0
Jun	.0	0	0	.0	0	0	0	0	0	0
Jul	.0	0	0	.0	0	0	0	0	0	0
Aug	.0	0	0	.0	0	0	0	0	0	0
Sep	.0	0	0	.0	0	0	0	0	0	0
Oct	#	1993	30	#	1993	0	0	0	0	0
Nov	2.0	1988	20	2.0	1988	2	1988	20	#+	1995
Dec	7.0	2000	26	17.5	2000	5	1987	16	#+	2000
Ann	7.5	Feb 1982	12	17.5	Dec 2000	10	Jan 1988	7	2	Jan 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	1.4	1.1	.4	.2	.0
Feb	.8	.7	.3	@	.0
Mar	.2	.2	.1	.1	.0
Apr	.0	.0	.0	.0	.0
May	.0	.0	.0	.0	.0
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.0	.0	.0	.0	.0
Oct	.0	.0	.0	.0	.0
Nov	.3	.2	.0	.0	.0
Dec	.9	.7	.3	.2	.0
Ann	3.6	2.9	1.1	.5	.0

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	2.3	.9	.3	.0
Feb	1.0	.5	.1	.0
Mar	@	.0	.0	.0
Apr	.0	.0	.0	.0
May	.0	.0	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.0	.0	.0	.0
Oct	.0	.0	.0	.0
Nov	.1	.0	.0	.0
Dec	.2	.0	.0	.0
Ann	3.6	1.4	.4	.0

+ Also occurred on an earlier date(s) #Denotes trace amounts

@ Denotes mean number of days greater than 0 but less than .05

-9/-9.9 represents missing values
Annual statistics for Mean/Median snow depths are not appropriate

(1) Derived from Snow Climatology and 1971-2000 daily data

(2) Derived from 1971-2000 daily data

Complete documentation available from:
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Freeze Data

Spring Freeze Dates (Month/Day)

Temp (F)	Probability of later date in spring (thru Jul 31) than indicated(*)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	5/06	5/01	4/27	4/24	4/21	4/18	4/14	4/11	4/05
32	4/15	4/12	4/09	4/07	4/05	4/03	4/01	3/29	3/26
28	4/10	4/05	4/01	3/29	3/27	3/24	3/21	3/17	3/12
24	3/27	3/21	3/17	3/14	3/10	3/07	3/03	2/27	2/21
20	3/23	3/16	3/11	3/06	3/02	2/26	2/22	2/16	2/09
16	3/19	3/10	3/04	2/27	2/22	2/17	2/11	2/05	1/27

Fall Freeze Dates (Month/Day)

Temp (F)	Probability of earlier date in fall (beginning Aug 1) than indicated(*)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	9/25	9/30	10/03	10/06	10/09	10/12	10/15	10/18	10/23
32	10/04	10/10	10/15	10/19	10/22	10/26	10/30	11/03	11/10
28	10/19	10/25	10/29	11/01	11/05	11/08	11/12	11/16	11/22
24	10/29	11/04	11/08	11/12	11/15	11/19	11/23	11/27	12/03
20	11/07	11/14	11/19	11/24	11/28	12/02	12/06	12/11	12/18
16	11/13	11/21	11/27	12/02	12/07	12/12	12/17	12/23	12/31

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	189	183	178	174	171	167	163	158	152
32	220	213	208	204	200	196	191	186	179
28	245	238	232	227	223	218	213	208	200
24	272	264	259	254	249	245	240	235	227
20	299	289	282	276	270	264	258	251	241
16	322	308	300	292	286	279	272	264	253

***** Probability of observing a temperature as cold, or colder, later in the spring or earlier in the fall than the indicated date.

0/00 Indicates that the probability of occurrence of threshold temperature is less than the indicated probability.

Derived from 1971-2000 serially complete daily data

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Degree Days to Selected Base Temperatures (˚F)

Heating Degree Days (1)

Base Below	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
65	889	643	415	163	44	3	0	2	33	136	475	797	3600
60	737	513	276	79	11	0	0	0	11	54	339	646	2666
57	651	439	204	45	4	0	0	0	4	27	266	560	2200
55	592	391	163	28	1	0	0	0	1	15	223	503	1917
50	453	286	84	7	0	0	0	0	0	3	135	368	1336
32	107	52	2	0	0	0	0	0	0	0	7	63	231

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	241	340	614	877	1124	1331	1542	1512	1217	932	527	289	10546
55	14	35	62	215	412	641	829	799	527	233	54	16	3837
57	10	26	41	171	352	581	767	737	471	184	37	11	3388
60	3	17	20	116	266	491	674	644	387	118	20	4	2760
65	0	0	4	49	145	344	519	492	260	45	5	0	1863
70	0	0	0	15	60	209	365	346	159	11	0	0	1165

Growing Degree Units (2)

Base	Growing Degree Units (Monthly)												Growing Degree Units (Accumulated Monthly)											
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
40	95	191	396	651	890	1104	1309	1278	987	695	319	124	95	286	682	1333	2223	3327	4636	5914	6901	7596	7915	8039
45	44	115	272	502	735	954	1154	1123	837	540	210	62	44	159	431	933	1668	2622	3776	4899	5736	6276	6486	6548
50	16	60	167	359	580	804	999	968	687	394	125	27	16	76	243	602	1182	1986	2985	3953	4640	5034	5159	5186
55	4	30	96	232	427	654	844	813	540	260	63	9	4	34	130	362	789	1443	2287	3100	3640	3900	3963	3972
60	0	9	47	133	281	504	689	658	400	150	27	1	0	9	56	189	470	974	1663	2321	2721	2871	2898	2899
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	75	143	263	418	585	757	863	834	653	447	203	90	75	218	481	899	1484	2241	3104	3938	4591	5038	5241	5331

(1) Derived from the 1971-2000 Monthly Normals
(2) Derived from 1971-2000 serially complete daily data
Note: For corn, temperatures below 50 are set to 50, and temperatures above 86 are set to 86

Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

Notes

a. The monthly means are simple arithmetic averages computed by summing the monthly values for the period 1971-2000 and dividing by thirty. Prior to averaging, the data are adjusted if necessary to compensate for data quality issues, station moves or changes in station reporting practices. Missing months are replaced by estimates based on neighboring stations.

b. The median is defined as the middle value in an ordered set of values. The median is being provided for the snow and precipitation elements because the mean can be a misleading value for precipitation normals.

c. Only observed validated values were used to select the extreme daily values.

d. Extreme monthly temperature/precipitation means were selected from the monthly normals data.
Monthly snow extremes were calculated from daily values quality controlled to be consistent with the Snow Climatology.

e. Degree Days were derived using the same techniques as the 1971-2000 normals.
Compete documentation for the 1971-2000 Normals is available on the internet from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

f. Mean "number of days statistics" for temperature and precipitation were calculated from a serially complete daily data set .
Documentation of the serially complete data set is available from the link below:

g. Snowfall and snow depth statistics were derived from the Snow Climatology.
Documentation for the Snow Climatology project is available from the link under references.

Data Sources for Tables

Several different data sources were used to create the Clim20 climate summaries. In some cases the daily extremes appear inconsistent with the monthly extremes and or the mean number of days statistics. For example, a high daily extreme value may not be reflected in the highest monthly value or the mean number of days threshold that is less than and equal to the extreme value. Some of these difference are caused by different periods of record. Daily extremes are derived from the station's entire period of record while the serial data and normals data were are for the 1971-2000 period. Therefore extremes observed before 1971 would not be included in the 1971-2000 normals or the 1971-2000 serial daily data set. Inconsistencies can also occur when monthly values are adjusted to reflect the current observing conditions or were replaced during the 1971-2000 Monthly Normals processing and are not reconciled with the Summary of the Day data.

a. Temperature/ Precipitation Tables
   1. 1971-2000 Monthly Normals
   2. Cooperative Summary of the Day
   3. National Weather Service station records
   4. 1971-2000 serially complete daily data

b. Degree Day Table
   1. Monthly and Annual Heating and Cooling Degree Days Normals to Selected Bases derived from 1971-2000 Monthly Normals
   2. Daily Normal Growing Degree Units to Selected Base Temperatures derived from 1971-2000 serially complete daily data

c. Snow Tables
   1. Snow Climatology
   2. Cooperative Summary of the Day

d. Freeze Data Table
   1971-2000 serially complete daily data

References

U.S. Climate Normals 1971-2000, www.ncdc.noaa.gov/normals.html
U.S. Climate Normals 1971-2000-Products Clim20, www.ncdc.noaa.gov/oa/climate/normals/usnormalsprods.html
Snow Climatology Project Description, www.ncdc.noaa.gov/oa/climate/monitoring/snowclim/mainpage.html
Eischeid, J. K., P. Pasteris, H. F. Diaz, M. Plantico, and N. Lott, 2000: Creating a serially complete, national daily time series of temperature and precipitation for the Western United States. J. Appl. Meteorol., 39, 1580-1591,
www1.ncdc.noaa.gov/pub/data/special/ serialcomplete_jam_0900.pdf