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: MANGUM, OK **COOP ID: 345509**

Climate Division: OK 7 **NWS Call Sign:** **Elevation: 1,595 Feet** **Lat: 34˚53N** **Lon: 99˚30W**

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	50.3	22.6	36.5	85+	1950	24	43.6	1989	-8	1988	8	25.4	1979	885	0	.0	.0	18.6	3.1	25.8	.2
Feb	57.1	27.2	42.2	94	1996	22	50.0	1976	-3	1996	3	30.7	1978	640	0	.0	.1	20.4	1.6	16.9	.2
Mar	65.8	34.8	50.3	100	1971	27	55.3	1974	-1	1948	11	45.4	1996	457	0	@	.8	28.5	.1	8.2	.0
Apr	74.9	44.3	59.6	106	1972	12	65.7	1972	20	1957	13	54.0	1997	198	37	.1	3.1	29.7	.0	1.7	.0
May	82.4	55.0	68.7	109+	1985	29	76.0	1996	33+	1954	3	63.9	1976	50	164	1.2	9.2	31.0	.0	.0	.0
Jun	91.1	64.5	77.8	117+	1980	24	82.7	1980	45	1998	7	73.6	1982	1	385	5.4	20.8	30.0	.0	.0	.0
Jul	96.4	67.8	82.1	117	1980	3	88.3	1998	53	1952	8	77.4	1975	0	531	13.7	28.4	31.0	.0	.0	.0
Aug	95.1	66.7	80.9	113	1964	6	85.6	1980	51	1962	27	74.5	1992	1	493	11.8	26.1	31.0	.0	.0	.0
Sep	87.1	59.1	73.1	109	1951	1	80.1	1998	31	1984	30	65.5	1974	20	262	3.1	15.9	30.0	.0	@	.0
Oct	76.3	46.9	61.6	104	2000	4	65.9	1998	14	1993	31	54.5	1976	149	44	.2	3.5	30.7	@	1.0	.0
Nov	62.3	34.4	48.4	90	1980	8	55.6	1999	8	1976	29	42.3	1972	500	0	.0	@	26.0	.1	9.6	.0
Dec	51.9	25.2	38.6	87	1955	24	43.4	1988	-11	1989	23	26.3	1983	820	0	.0	.0	20.6	1.7	22.2	.1
Ann	74.2	45.7	60.0	117+	Jul 1980	3	88.3	Jul 1998	-11	Dec 1989	23	25.4	Jan 1979	3721	1916	35.5	107.9	327.5	6.6	85.4	.5

\+ 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	.90	.98	2.03	1990	19	3.03	1990	.00+	1997
Feb	1.16	.97	2.80	1997	20	4.30	1997	.00+	1999
Mar	1.71	1.55	2.21	1988	3	4.43	1998	.00+	1997
Apr	2.25	1.90	2.62	1997	25	9.29	1997	.00+	1996
May	4.65	3.45	4.95	1980	28	16.99	1980	.46	1988
Jun	4.20	4.19	3.78	1994	4	10.94	1982	.20	1998
Jul	2.22	2.08	4.62	1972	11	7.06	1975	.00	1980
Aug	2.75	2.35	5.12	1997	11	10.18	1996	.00	2000
Sep	3.13	2.79	5.46	1970	23	9.03	1986	.00+	2000
Oct	2.67	2.14	6.45	1983	20	11.01	1983	.00	1992
Nov	1.37	1.16	2.15	1961	2	5.72	1992	.00+	1999
Dec	1.07	.84	1.96	1991	12	4.04	1984	.00	1989
Ann	28.08	27.97	6.45	Oct 1983	20	16.99	May 1980	.00+	Sep 2000

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	3.2	1.8	.5	.2
Feb	3.5	2.3	.8	.2
Mar	4.4	3.2	1.2	.5
Apr	5.1	3.8	1.7	.6
May	7.6	5.8	2.8	1.6
Jun	6.3	5.0	3.0	1.4
Jul	4.5	3.3	1.2	.7
Aug	5.4	4.1	1.7	.8
Sep	5.4	4.2	1.9	.9
Oct	5.2	3.8	1.8	.8
Nov	4.3	2.8	.8	.3
Dec	3.6	2.4	.9	.2
Ann	58.5	42.5	18.3	8.2

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	.00	.07	.20	.36	.55	.78	1.09	1.52	2.26	3.01
Feb	.00	.00	.05	.22	.43	.68	1.00	1.41	1.99	2.99	4.02
Mar	.00	.00	.50	.80	1.09	1.40	1.75	2.18	2.72	3.63	4.49
Apr	.00	.19	.56	.92	1.29	1.70	2.19	2.79	3.61	4.97	6.30
May	.66	1.04	1.71	2.36	3.03	3.77	4.63	5.68	7.10	9.41	11.64
Jun	.85	1.23	1.84	2.41	2.98	3.59	4.28	5.11	6.21	7.97	9.64
Jul	.02	.11	.35	.63	.98	1.41	1.94	2.64	3.65	5.40	7.18
Aug	.11	.33	.72	1.12	1.56	2.06	2.64	3.38	4.39	6.08	7.74
Sep	.00	.16	.59	1.05	1.57	2.18	2.91	3.83	5.12	7.32	9.50
Oct	.06	.23	.58	.95	1.38	1.87	2.48	3.24	4.32	6.14	7.95
Nov	.00	.00	.33	.57	.81	1.07	1.37	1.74	2.22	3.03	3.81
Dec	.01	.05	.16	.29	.46	.67	.93	1.27	1.77	2.63	3.51
Ann	18.18	20.03	22.43	24.28	25.94	27.56	29.24	31.12	33.41	36.77	39.71

\+ 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

Complete documentation available from:
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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	2.1	.5	#	0
Feb	1.4	.0	#	0
Mar	#	.0	#	0
Apr	.1	.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
Dec	1.6	.0	#	0
Ann	5.3	.5	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	5.0	1995	22	9.0	1973	5	1973	12	2	1973
Feb	6.0	1983	5	8.5	1975	8	1986	10	4	1986
Mar	#	1988	14	#+	1988	4	1994	9	#+	1994
Apr	1.5	1973	8	1.5	1973	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	.0	0	0	.0	0	0	0	0	0	0
Nov	1.0	1972	19	1.0	1972	#	1972	21	#	1972
Dec	5.0	1974	11	8.0	1975	5	1974	11	#+	1985
Ann	6.0	Feb 1983	5	9.0	Jan 1973	8	Feb 1986	10	4	Feb 1986

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	1.0	.6	.3	.1	.0
Feb	.8	.6	.1	.1	.0
Mar	.0	.0	.0	.0	.0
Apr	.1	.1	.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	.1	.1	.0	.0	.0
Dec	.7	.6	.2	.1	.0
Ann	2.7	2.0	.6	.3	.0

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	.6	.5	.2	.0
Feb	.4	.2	.1	.0
Mar	.0	.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	.0	.0	.0	.0
Dec	.3	.1	@	.0
Ann	1.3	.8	.3	.0

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

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

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

(2) Derived from 1971-2000 daily data

-9/-9.9 represents missing values

Annual statistics for Mean/Median snow depths are not appropriate

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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	4/28	4/24	4/21	4/18	4/15	4/12	4/10	4/06	4/02
32	4/14	4/11	4/09	4/07	4/06	4/04	4/02	3/31	3/28
28	4/11	4/05	3/31	3/28	3/24	3/20	3/16	3/12	3/06
24	3/30	3/22	3/17	3/12	3/08	3/04	2/27	2/22	2/14
20	3/12	3/05	2/27	2/22	2/18	2/14	2/09	2/03	1/27
16	3/06	2/26	2/21	2/16	2/11	2/07	2/02	1/27	1/19

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	10/01	10/07	10/11	10/15	10/18	10/21	10/25	10/29	11/04
32	10/13	10/20	10/25	10/29	11/02	11/05	11/09	11/14	11/21
28	10/24	10/29	11/03	11/06	11/10	11/13	11/17	11/21	11/27
24	10/29	11/06	11/12	11/17	11/22	11/26	12/01	12/07	12/15
20	11/15	11/22	11/26	12/01	12/04	12/08	12/12	12/17	12/24
16	11/15	11/26	12/04	12/11	12/18	12/24	12/31	1/08	1/19

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	205	198	193	189	185	181	177	172	165
32	230	223	218	213	209	205	201	196	189
28	254	246	240	235	230	225	220	214	206
24	289	278	271	264	258	252	245	237	227
20	317	307	300	294	289	283	277	270	261
16	353	332	321	313	305	297	290	280	268

***** 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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
65	885	640	457	198	50	1	0	1	20	149	500	820	3721
60	730	508	310	103	15	0	0	0	4	63	357	665	2755
57	638	431	229	62	6	0	0	0	1	33	278	574	2252
55	578	381	181	41	3	0	0	0	0	19	230	515	1948
50	434	268	90	11	0	0	0	0	0	3	131	374	1311
32	71	35	1	0	0	0	0	0	0	0	3	49	159

Cooling Degree Days (1)

Base	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	209	319	568	829	1137	1374	1554	1515	1232	918	493	253	10401
55	3	21	35	180	427	684	841	802	542	224	30	6	3795
57	1	15	21	141	368	624	779	740	482	176	18	2	3367
60	0	8	9	92	284	534	686	647	396	113	7	0	2776
65	0	0	0	37	164	385	531	493	262	44	0	0	1916
70	0	0	0	10	77	244	376	344	153	11	0	0	1215

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	99	212	428	665	965	1186	1364	1318	1043	738	327	126	99	311	739	1404	2369	3555	4919	6237	7280	8018	8345	8471
45	44	122	292	517	810	1036	1209	1163	893	583	210	53	44	166	458	975	1785	2821	4030	5193	6086	6669	6879	6932
50	11	59	179	374	655	886	1054	1008	743	436	118	17	11	70	249	623	1278	2164	3218	4226	4969	5405	5523	5540
55	1	24	93	243	502	736	899	853	596	298	54	0	1	25	118	361	863	1599	2498	3351	3947	4245	4299	4299
60	0	6	40	135	354	586	744	698	451	172	18	0	0	6	46	181	535	1121	1865	2563	3014	3186	3204	3204
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	105	176	303	434	617	772	863	836	673	474	222	114	105	281	584	1018	1635	2407	3270	4106	4779	5253	5475	5589

(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