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: WAYNOKA 3 S, OK **COOP ID: 349404**

Climate Division: OK 3 **NWS Call Sign:** **Elevation: 1,450 Feet** **Lat: 36˚32N** **Lon: 98˚53W**

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	46.5	19.5	33.0	84	1967	22	40.8	1990	-14	1988	8	20.4	1979	991	0	.0	.0	15.2	4.9	27.1	.8
Feb	53.5	24.8	39.2	93	1962	12	49.9	1976	-11	1996	4	26.4	1978	725	0	.0	@	18.1	2.9	20.1	.4
Mar	62.6	33.3	48.0	94	1956	25	54.1	1972	-4	1960	3	40.3	1996	531	1	.0	.2	26.0	.4	11.7	.0
Apr	72.7	43.7	58.2	103	1953	22	65.2	1981	20+	1975	3	51.5	1983	241	36	.0	1.1	29.4	.0	2.6	.0
May	81.5	55.0	68.3	108	1953	31	74.7	1996	30	1954	3	61.6	1995	56	156	.5	4.9	31.0	.0	.1	.0
Jun	90.6	64.7	77.7	113	1953	15	83.2	1990	42	1954	4	71.9	1982	5	384	2.7	17.3	30.0	.0	.0	.0
Jul	96.6	69.6	83.1	114	1954	15	89.0	1980	47	1952	9	79.8	1989	0	561	9.7	26.3	31.0	.0	.0	.0
Aug	94.7	67.8	81.3	114+	1951	6	87.1	1983	45	1988	29	75.3	1992	1	505	8.0	23.4	31.0	.0	.0	.0
Sep	86.4	59.2	72.8	110+	2000	4	80.4	1998	30	1989	24	64.8	1974	26	259	2.5	12.5	30.0	.0	.1	.0
Oct	75.1	45.8	60.5	102	1954	5	66.3	1979	8	1993	31	54.7	1976	180	39	@	2.0	30.5	@	2.1	.0
Nov	60.1	32.2	46.2	91	1980	8	55.3	1999	5	1993	26	40.9	1985	566	0	.0	@	23.6	.4	13.5	.0
Dec	48.6	22.1	35.4	88	1955	25	40.2	1998	-14	1989	23	22.0	1983	919	0	.0	.0	16.3	2.8	25.6	.7
Ann	72.4	44.8	58.6	114+	Jul 1954	15	89.0	Jul 1980	-14+	Dec 1989	23	20.4	Jan 1979	4241	1941	23.4	87.7	312.1	11.4	102.9	1.9

+ 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

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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	.74	.57	1.20	1949	10	2.23	1973	.00+	1996
Feb	1.08	.69	2.00	1948	26	3.68	1987	.00+	1999
Mar	2.29	1.88	2.57	1983	4	6.99	2000	.00	1972
Apr	2.27	1.85	3.00	1999	14	8.29	1999	.02	1996
May	4.74	4.42	4.78	2000	25	12.27	1993	.40	1985
Jun	3.22	3.06	3.45	1963	23	7.61	1995	.43	1990
Jul	2.55	2.17	3.30	1999	8	7.17	1979	.00	1983
Aug	2.78	1.52	3.25	1977	11	10.57	1977	.00+	2000
Sep	2.65	2.44	3.47	1974	2	7.22	1996	.00	2000
Oct	2.29	1.57	3.70	1998	31	8.57	1998	.00+	1999
Nov	1.56	1.43	2.85	1981	1	5.28	1992	.00+	1999
Dec	.98	.72	1.54	1980	8	3.84	1984	.00	1976
Ann	27.15	28.44	4.78	May 2000	25	12.27	May 1993	.00+	Sep 2000

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	3.6	2.0	.5	.1
Feb	3.7	2.3	.7	.2
Mar	5.6	3.9	1.5	.7
Apr	5.9	4.2	1.5	.5
May	8.0	6.1	3.1	1.6
Jun	7.0	5.2	2.5	1.1
Jul	5.3	3.6	1.8	.7
Aug	6.0	4.3	2.0	.9
Sep	5.9	4.0	1.6	.9
Oct	4.5	3.3	1.6	.6
Nov	4.0	2.6	.8	.4
Dec	3.4	2.3	.7	.1
Ann	62.9	43.8	18.3	7.8

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	.06	.18	.29	.42	.55	.72	.91	1.19	1.64	2.09
Feb	.00	.04	.16	.31	.49	.70	.96	1.30	1.78	2.61	3.44
Mar	.07	.24	.55	.88	1.25	1.67	2.17	2.80	3.68	5.16	6.62
Apr	.21	.38	.68	1.00	1.34	1.73	2.19	2.77	3.56	4.87	6.16
May	.87	1.29	1.99	2.63	3.29	4.00	4.81	5.78	7.08	9.16	11.15
Jun	.63	.92	1.40	1.83	2.27	2.74	3.28	3.92	4.78	6.14	7.44
Jul	.16	.41	.81	1.19	1.58	2.02	2.52	3.15	3.99	5.37	6.71
Aug	.00	.05	.32	.67	1.11	1.66	2.36	3.28	4.63	7.00	9.41
Sep	.09	.30	.68	1.06	1.48	1.96	2.53	3.25	4.24	5.89	7.51
Oct	.00	.06	.32	.63	1.00	1.45	2.01	2.75	3.80	5.62	7.47
Nov	.00	.07	.28	.51	.77	1.07	1.44	1.91	2.57	3.68	4.80
Dec	.05	.15	.30	.44	.60	.77	.97	1.21	1.55	2.10	2.64
Ann	19.02	20.59	22.60	24.13	25.49	26.80	28.17	29.67	31.50	34.16	36.47

\+ 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	3.1	2.0	#	0
Feb	3.7	1.5	1	0
Mar	2.1	.0	1	0
Apr	.4	.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	.8	.0	#	0
Dec	2.3	1.5	#	0
Ann	12.4	5.0	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	8.0	1988	6	16.0	1988	16	1988	7	4	1988
Feb	17.0	1971	22	17.5	1975	26	1971	22	5	1982
Mar	13.0	1988	17	25.0	1988	14	1988	17	14	1988
Apr	10.0	1973	8	10.0	1973	2	1983	5	#+	1983
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	2	1991	31	#	1991
Nov	5.5	1988	20	9.0	1972	9	1972	21	1	1972
Dec	10.0	1987	14	10.0	1987	9	1971	3	1	1997
Ann	17.0	Feb 1971	22	25.0	Mar 1988	26	Feb 1971	22	14	Mar 1988

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	1.6	1.0	.3	.1	.0
Feb	1.3	1.0	.6	.3	@
Mar	.6	.5	.3	.1	@
Apr	.1	@	@	@	@
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	.4	.3	.2	@	.0
Dec	1.0	.7	.3	.2	@
Ann	5.0	3.5	1.7	.7	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	1.2	.3	.1	.0
Feb	3.2	2.0	1.1	.4
Mar	.4	.2	.1	.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	.9	.3	.1	.0
Ann	5.8	2.8	1.4	.4

+ 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

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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	5/07	5/02	4/28	4/25	4/22	4/19	4/16	4/12	4/07
32	4/27	4/22	4/18	4/15	4/12	4/09	4/06	4/02	3/28
28	4/16	4/11	4/07	4/03	3/31	3/28	3/25	3/21	3/15
24	4/08	4/01	3/28	3/24	3/21	3/17	3/13	3/09	3/02
20	3/28	3/21	3/17	3/13	3/09	3/06	3/02	2/25	2/19
16	3/16	3/07	3/01	2/24	2/19	2/14	2/09	2/03	1/25

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	9/23	9/28	10/02	10/05	10/08	10/11	10/14	10/18	10/23
32	10/02	10/08	10/12	10/16	10/19	10/22	10/26	10/30	11/05
28	10/20	10/25	10/28	10/31	11/03	11/05	11/08	11/12	11/16
24	10/24	10/31	11/05	11/09	11/13	11/17	11/21	11/26	12/03
20	11/02	11/09	11/14	11/18	11/22	11/26	11/30	12/05	12/12
16	11/10	11/17	11/22	11/26	11/30	12/03	12/07	12/12	12/19

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	192	184	178	173	169	164	159	153	145
32	214	205	199	194	189	184	179	173	165
28	236	229	224	220	216	212	208	203	196
24	261	253	247	242	237	232	227	221	213
20	286	276	269	263	257	251	245	238	228
16	315	304	296	289	283	276	270	262	251

***** 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	991	725	531	241	56	5	0	1	26	180	566	919	4241
60	836	596	385	142	18	0	0	0	7	85	422	764	3255
57	744	518	302	96	7	0	0	0	2	49	342	672	2732
55	684	468	252	71	4	0	0	0	0	32	291	611	2413
50	538	351	149	27	0	0	0	0	0	8	182	467	1722
32	134	78	6	0	0	0	0	0	0	0	10	92	320

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	165	276	499	786	1124	1369	1584	1527	1223	882	434	196	10065
55	3	23	32	166	414	679	871	814	533	200	25	2	3762
57	1	17	20	131	356	619	809	752	475	155	16	1	3352
60	0	10	10	87	273	529	716	659	389	99	6	0	2778
65	0	0	1	36	156	384	561	505	259	39	0	0	1941
70	0	0	0	12	73	250	406	355	153	10	0	0	1259

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	63	147	338	577	885	1133	1338	1285	998	667	259	77	63	210	548	1125	2010	3143	4481	5766	6764	7431	7690	7767
45	25	77	216	433	730	983	1183	1130	848	515	156	32	25	102	318	751	1481	2464	3647	4777	5625	6140	6296	6328
50	3	33	128	299	576	833	1028	975	698	370	83	10	3	36	164	463	1039	1872	2900	3875	4573	4943	5026	5036
55	0	11	66	182	423	683	873	820	550	240	34	0	0	11	77	259	682	1365	2238	3058	3608	3848	3882	3882
60	0	1	28	98	282	533	718	665	407	135	13	0	0	1	29	127	409	942	1660	2325	2732	2867	2880	2880
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	75	133	242	383	572	750	869	836	645	432	190	77	75	208	450	833	1405	2155	3024	3860	4505	4937	5127	5204

(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:
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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