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: EL RENO 1 N, OK **COOP ID: 342818**

Climate Division: OK 5 **NWS Call Sign:** **Elevation: 1,315 Feet** **Lat: 35˚33N** **Lon: 97˚57W**

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	22.8	34.7	88	1911	31	43.0	1990	-10+	1902	27	23.7	1979	942	0	.0	.0	15.2	4.2	23.9	.4
Feb	53.0	27.4	40.2	93	1904	28	50.0	1976	-15	1905	13	26.9	1978	699	0	.0	@	18.3	2.6	16.6	.2
Mar	61.6	35.0	48.3	97+	1916	21	53.9	1974	1	1960	3	43.8	1984	518	0	.0	.2	26.9	.3	8.4	.0
Apr	71.0	45.3	58.2	103	1972	12	64.6	1981	18	1975	3	51.7	1983	231	26	@	.5	29.6	.0	1.5	.0
May	79.6	56.4	68.0	105	1985	30	73.6	1996	29	1903	1	63.1	1976	45	139	.1	3.0	31.0	.0	.0	.0
Jun	87.9	65.2	76.6	108+	1911	24	81.1	1990	37	1894	6	72.0	1982	3	349	.8	14.2	30.0	.0	.0	.0
Jul	93.7	70.2	82.0	115	1914	15	87.3	1980	50	1952	9	78.6	1975	0	525	5.4	24.9	31.0	.0	.0	.0
Aug	92.6	68.2	80.4	112	1952	16	86.1	2000	31	1915	5	74.2	1992	1	478	4.9	23.8	31.0	.0	.0	.0
Sep	84.3	59.8	72.1	108+	2000	3	80.0	1998	30	1902	13	64.1	1974	27	238	1.0	10.3	30.0	.0	@	.0
Oct	73.7	48.3	61.0	100	1898	3	64.7	1979	16	1917	30	54.9	1976	163	39	.0	1.0	30.7	.0	1.2	.0
Nov	59.1	35.3	47.2	89	1894	16	55.9	1999	2	1906	20	40.8	1972	535	0	.0	.0	24.1	.2	9.5	.0
Dec	49.0	26.6	37.8	89	1955	24	46.3	1988	-11	1989	23	23.5	1983	844	0	.0	.0	16.8	2.6	20.7	.3
Ann	71.0	46.7	58.9	115	Jul 1914	15	87.3	Jul 1980	-15	Feb 1905	13	23.5	Dec 1983	4008	1794	12.2	77.9	314.6	9.9	81.8	.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: 1893-2001

(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	1.12	.90	2.58	1982	30	3.43	1973	.00+	1996
Feb	1.36	1.14	5.40	1898	9	3.83	1997	.00	1991
Mar	2.72	2.46	3.09	1990	11	8.77	1973	.04	1997
Apr	2.99	3.01	3.95	1897	28	6.90	1997	.04	1987
May	5.84	5.31	5.18	1987	28	15.00	1987	.62	1988
Jun	4.92	4.06	4.70	1995	4	12.91	1989	.92	1990
Jul	2.65	2.03	6.50	1913	1	10.01	1975	.00+	1998
Aug	2.72	2.28	4.55+	1914	16	7.81	1989	.02	2000
Sep	3.36	2.52	7.08	1961	13	8.65	1986	.25	2000
Oct	3.03	2.68	4.25	1983	20	8.92	1983	.46	1982
Nov	2.14	1.89	6.12	1953	19	7.76	1992	.00	1989
Dec	1.42	1.03	2.54	1911	9	4.71	1999	.03	1985
Ann	34.27	35.85	7.08	Sep 1961	13	15.00	May 1987	.00+	Jul 1998

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	4.4	2.0	.6	.4
Feb	5.0	3.1	.7	.3
Mar	6.8	4.6	1.7	.9
Apr	7.1	4.5	2.2	.9
May	9.9	6.9	3.6	2.0
Jun	8.7	6.1	3.1	1.9
Jul	5.7	4.0	1.6	.7
Aug	6.0	4.0	1.7	.8
Sep	6.7	4.7	2.2	1.1
Oct	6.6	4.2	2.1	.9
Nov	5.8	3.5	1.2	.6
Dec	5.3	3.0	1.0	.4
Ann	78.0	50.6	21.7	10.9

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	.19	.37	.57	.79	1.06	1.39	1.85	2.62	3.38
Feb	.05	.17	.36	.56	.77	1.02	1.30	1.66	2.16	2.98	3.79
Mar	.17	.33	.67	1.04	1.46	1.94	2.53	3.29	4.34	6.12	7.89
Apr	.39	.63	1.06	1.47	1.91	2.40	2.96	3.65	4.59	6.13	7.62
May	1.41	1.95	2.81	3.57	4.32	5.12	6.01	7.08	8.47	10.68	12.75
Jun	1.25	1.71	2.43	3.06	3.68	4.34	5.08	5.95	7.09	8.89	10.57
Jul	.00	.00	.79	1.25	1.70	2.18	2.72	3.37	4.20	5.58	6.90
Aug	.17	.33	.66	1.03	1.45	1.94	2.53	3.29	4.35	6.15	7.94
Sep	.51	.79	1.28	1.74	2.22	2.75	3.36	4.11	5.10	6.73	8.29
Oct	.52	.78	1.22	1.64	2.06	2.52	3.05	3.69	4.54	5.92	7.24
Nov	.10	.29	.61	.92	1.26	1.63	2.08	2.63	3.39	4.64	5.87
Dec	.06	.13	.29	.47	.69	.96	1.28	1.70	2.30	3.34	4.38
Ann	23.16	25.27	27.99	30.07	31.93	33.73	35.61	37.69	40.22	43.91	47.13

\+ 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: 1893-2001
(3) Derived from 1971-2000 serially complete daily data

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Snow (inches)

Snow Totals

Means/Medians (1)

Extremes (2)

Mean Number of Days (1)

Snow Fall >= Thresholds

Snow Depth >= Thresholds

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median	Highest Daily Snow Fall	Year	Day	Highest Monthly Snow Fall	Year	Highest Daily Snow Depth	Year	Day	Highest Monthly Mean Snow Depth	Year	0.1	1.0	3.0	5.0	10.0	1	3	5	10
Jan	2.9	.8	#	0	7.5	1995	22	11.1	1988	11	1988	7	1	1988	1.6	.9	.3	.2	.0	.1	.1	.0	.0
Feb	2.1	.8	#	0	6.0	1971	22	7.1	1971	1	1977	26	#+	1997	1.5	.9	.2	.1	.0	.1	.0	.0	.0
Mar	.2	.0	0	0	1.0	1974	21	1.5	1982	0	0	0	0	0	.2	.1	.0	.0	.0	.0	.0	.0	.0
Apr	.1	.0	0	0	1.5	1973	8	1.5	1973	0	0	0	0	0	.1	.1	.0	.0	.0	.0	.0	.0	.0
May	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Jun	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Jul	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Aug	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Sep	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Oct	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Nov	.7	.0	#	0	4.0	1972	19	8.3	1972	1	1975	26	#	1975	.5	.2	.1	.0	.0	.1	.0	.0	.0
Dec	.9	.1	#	0	4.0	1971	3	6.1	1975	3	2000	27	#+	2000	.9	.5	.2	.0	.0	.0	.0	.0	.0
Ann	6.9	1.7	N/A	N/A	7.5	Jan 1995	22	11.1	Jan 1988	11	Jan 1988	7	1	Jan 1988	4.8	2.7	.8	.3	.0	.3	.1	.0	.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	4/27	4/22	4/19	4/17	4/14	4/12	4/09	4/06	4/02
32	4/16	4/12	4/09	4/06	4/04	4/01	3/30	3/27	3/22
28	4/12	4/06	4/01	3/28	3/24	3/21	3/17	3/12	3/06
24	4/04	3/27	3/21	3/16	3/11	3/06	3/01	2/23	2/15
20	3/23	3/14	3/07	3/01	2/24	2/18	2/13	2/06	1/28
16	3/09	3/01	2/23	2/17	2/12	2/07	2/02	1/26	1/15

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	9/30	10/06	10/10	10/14	10/17	10/21	10/24	10/29	11/04
32	10/11	10/17	10/22	10/26	10/30	11/03	11/07	11/12	11/19
28	10/21	10/29	11/03	11/08	11/12	11/16	11/21	11/26	12/03
24	10/27	11/04	11/10	11/15	11/20	11/25	11/30	12/06	12/14
20	10/30	11/11	11/20	11/28	12/05	12/12	12/19	12/28	1/09
16	11/16	11/27	12/05	12/11	12/18	12/24	12/31	1/08	1/21

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	209	201	195	190	185	181	176	170	162
32	233	225	219	214	209	204	199	193	185
28	258	249	243	237	232	226	221	214	205
24	289	276	268	260	253	246	239	230	218
20	317	300	291	284	278	272	265	257	247
16	>365	334	320	311	303	296	289	280	269

***** 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	942	699	518	231	45	3	0	1	27	163	535	844	4008
60	788	569	366	127	12	0	0	0	7	72	393	690	3024
57	697	492	281	80	4	0	0	0	2	38	312	602	2508
55	637	443	228	56	2	0	0	0	0	24	263	545	2198
50	495	331	122	17	0	0	0	0	0	5	160	406	1536
32	121	71	3	0	0	0	0	0	0	0	8	76	279

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	203	300	508	785	1116	1336	1548	1500	1201	899	463	255	10114
55	6	28	20	151	405	646	835	787	511	210	29	11	3639
57	3	21	11	115	345	586	773	725	453	163	18	7	3220
60	1	14	4	72	260	496	680	632	368	103	9	1	2640
65	0	0	0	26	139	349	525	478	238	39	0	0	1794
70	0	0	0	6	56	213	371	328	136	10	0	0	1120

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	85	186	378	610	899	1123	1323	1289	998	702	300	113	85	271	649	1259	2158	3281	4604	5893	6891	7593	7893	8006
45	35	106	255	463	744	973	1168	1134	848	547	183	55	35	141	396	859	1603	2576	3744	4878	5726	6273	6456	6511
50	9	52	154	326	590	823	1013	979	698	399	103	20	9	61	215	541	1131	1954	2967	3946	4644	5043	5146	5166
55	1	20	80	204	435	673	858	824	551	263	48	5	1	21	101	305	740	1413	2271	3095	3646	3909	3957	3962
60	0	6	36	106	290	523	703	669	408	151	16	0	0	6	42	148	438	961	1664	2333	2741	2892	2908	2908
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	74	134	250	387	592	762	882	856	661	446	181	82	74	208	458	845	1437	2199	3081	3937	4598	5044	5225	5307

(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