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: NOWATA, OK **COOP ID: 346485**

Climate Division: OK 3 **NWS Call Sign:** **Elevation: 710 Feet** **Lat: 36˚42N** **Lon: 95˚38W**

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	24.4	35.5	78	1950	25	43.1	1990	-13	1949	30	22.8	1979	916	0	.0	.0	12.4	4.9	24.0	.7
Feb	53.3	29.2	41.3	89	1962	12	51.0	1976	-9	1996	4	28.8	1978	671	0	.0	.0	16.5	2.7	17.9	.5
Mar	63.3	38.3	50.8	93	1974	31	55.5	1974	-4	1948	12	44.8	1996	442	1	.0	.1	26.2	.3	9.3	.0
Apr	73.0	47.1	60.1	101	1972	12	67.9	1981	14	1957	13	53.4	1983	191	41	@	.3	29.5	.0	1.6	.0
May	79.6	56.8	68.2	97	1953	31	73.3	1987	29	1982	7	63.6	1976	50	149	.0	.9	31.0	.0	.1	.0
Jun	87.7	65.5	76.6	107	1952	29	80.2	1977	47+	1954	4	72.2	1992	2	350	.2	11.0	30.0	.0	.0	.0
Jul	93.8	69.9	81.9	117	1954	14	89.5	1980	50	1971	31	78.0	1994	0	522	4.6	23.4	31.0	.0	.0	.0
Aug	93.4	68.6	81.0	114+	1956	6	87.1	1980	48	1950	21	74.8	1992	1	497	4.2	22.7	31.0	.0	.0	.0
Sep	85.2	60.7	73.0	108+	2000	1	80.3	1998	33	1984	30	64.1	1974	28	267	1.1	9.4	30.0	.0	.0	.0
Oct	74.4	49.3	61.9	99+	1952	2	65.8	2000	17	1993	31	56.6	1976	143	45	.0	1.1	30.7	.0	1.3	.0
Nov	60.6	37.9	49.3	89	1963	9	58.1	1999	5+	1950	25	43.5	1976	476	4	.0	.0	23.9	.2	9.9	.0
Dec	49.4	27.9	38.7	79	1966	7	44.5	1971	-13	1989	23	25.0	1983	818	0	.0	.0	15.1	2.9	21.9	.5
Ann	71.7	48.0	59.9	117	Jul 1954	14	89.5	Jul 1980	-13+	Dec 1989	23	22.8	Jan 1979	3738	1876	10.1	68.9	307.3	11.0	86.0	1.7

\+ 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

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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	1.75	1.51	2.40	1975	31	4.13	1998	.03	1986
Feb	1.96	1.67	5.60	1985	23	7.29	1985	.00	1991
Mar	3.82	3.67	3.72	1974	10	8.65	1974	.45	1971
Apr	3.95	3.82	3.80	1983	23	8.87	1995	.00	1989
May	5.07	4.21	3.81	1952	23	11.16	1995	1.49	1988
Jun	4.71	4.21	5.03	1948	22	10.45	1995	1.11	1988
Jul	2.83	3.06	4.00	1986	13	6.31	1994	.12	1974
Aug	2.89	2.54	7.73	1961	14	7.34	1977	.00	2000
Sep	5.08	4.61	6.50	1986	30	16.27	1986	.06	1978
Oct	3.55	2.91	4.45	1972	22	9.17	1983	.33	1978
Nov	3.80	3.61	4.06	1974	3	8.40	1985	.20	1976
Dec	2.27	1.86	2.17	1971	15	5.52	1971	.13	2000
Ann	41.68	40.20	7.73	Aug 1961	14	16.27	Sep 1986	.00+	Aug 2000

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	5.2	4.1	.9	.4
Feb	4.9	3.6	1.3	.5
Mar	7.6	6.1	2.7	1.1
Apr	7.6	5.9	2.9	1.2
May	8.7	7.3	3.8	1.7
Jun	7.4	6.1	3.3	1.6
Jul	5.3	4.3	2.0	.8
Aug	5.3	4.3	2.2	.9
Sep	6.9	5.4	2.6	1.5
Oct	6.0	4.7	2.6	1.2
Nov	6.0	4.8	2.3	1.4
Dec	5.0	3.9	1.7	.7
Ann	75.9	60.5	28.3	13.0

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	.14	.26	.49	.73	1.00	1.30	1.66	2.12	2.76	3.82	4.86
Feb	.23	.48	.81	1.09	1.37	1.67	2.01	2.41	2.95	3.81	4.62
Mar	.73	1.07	1.63	2.15	2.67	3.24	3.88	4.65	5.68	7.33	8.90
Apr	.76	1.31	1.97	2.51	3.03	3.56	4.15	4.84	5.73	7.13	8.43
May	1.73	2.21	2.91	3.50	4.07	4.66	5.29	6.04	7.00	8.47	9.84
Jun	1.33	1.78	2.45	3.04	3.62	4.22	4.89	5.67	6.69	8.29	9.78
Jul	.32	.54	.94	1.33	1.75	2.22	2.77	3.45	4.38	5.91	7.39
Aug	.61	1.01	1.50	1.88	2.25	2.63	3.04	3.53	4.15	5.13	6.03
Sep	.67	1.07	1.80	2.50	3.25	4.07	5.03	6.20	7.79	10.40	12.92
Oct	.63	.95	1.47	1.95	2.44	2.98	3.59	4.33	5.31	6.90	8.41
Nov	.52	.83	1.37	1.90	2.46	3.07	3.77	4.64	5.81	7.73	9.57
Dec	.20	.35	.65	.97	1.31	1.71	2.17	2.76	3.57	4.92	6.25
Ann	29.25	31.64	34.71	37.04	39.12	41.13	43.21	45.50	48.29	52.35	55.85

\+ 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	4.4	1.0	#	0
Feb	3.1	2.0	#	0
Mar	.5	.0	#	0
Apr	#	.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	.7	.0	#	0
Dec	1.1	.0	#	0
Ann	9.8	3.0	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	7.0	1997	9	23.0	1979	8	1979	14	5	1979
Feb	9.0	1980	8	9.0	1980	4	1996	2	1	1996
Mar	7.0	1989	6	7.0	1989	2+	1997	25	#+	1997
Apr	#	1973	9	#	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	6.0	1971	24	6.0	1971	1	1975	26	#+	1975
Dec	5.0	1972	15	7.0	1972	5	1972	15	#+	1996
Ann	9.0	Feb 1980	8	23.0	Jan 1979	8	Jan 1979	14	5	Jan 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	1.7	1.6	.2	.1	.0
Feb	1.1	.9	.3	.1	.0
Mar	.4	.3	.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
Dec	.6	.5	.1	@	.0
Ann	4.1	3.5	.7	.2	.0

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	5.7	3.2	1.7	.0
Feb	.7	.3	.0	.0
Mar	.2	.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	.6	.1	.1	.0
Ann	7.3	3.6	1.8	.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

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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	4/20	4/18	4/15	4/12	4/10	4/06	4/02
32	4/21	4/15	4/12	4/08	4/05	4/02	3/30	3/26	3/21
28	4/06	4/01	3/28	3/25	3/23	3/20	3/17	3/14	3/09
24	3/29	3/24	3/20	3/16	3/13	3/09	3/06	3/02	2/24
20	3/23	3/14	3/08	3/02	2/25	2/20	2/14	2/08	1/30
16	3/12	3/04	2/26	2/21	2/16	2/11	2/06	1/31	1/23

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	9/28	10/04	10/08	10/11	10/14	10/17	10/21	10/25	10/30
32	10/14	10/19	10/22	10/26	10/29	11/01	11/04	11/08	11/13
28	10/22	10/28	11/02	11/06	11/10	11/13	11/17	11/22	11/28
24	10/28	11/05	11/11	11/16	11/20	11/25	11/30	12/05	12/13
20	11/10	11/17	11/22	11/26	11/30	12/04	12/09	12/14	12/21
16	11/11	11/22	11/30	12/07	12/13	12/19	12/26	1/03	1/13

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	203	195	190	186	181	177	173	167	160
32	229	221	215	210	206	201	196	190	182
28	255	247	241	236	231	226	221	216	207
24	278	269	262	257	252	247	241	235	226
20	310	299	291	284	278	271	264	256	245
16	337	322	312	304	297	289	282	273	260

***** 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)

Base — Heating Degree Days (1)

Below	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
65	916	671	442	191	50	2	0	1	28	143	476	818	3738
60	762	541	299	100	14	0	0	0	8	59	339	666	2788
57	672	465	222	60	6	0	0	0	3	30	265	578	2301
55	616	417	178	40	3	0	0	0	0	17	221	522	2014
50	473	307	93	11	0	0	0	0	0	3	132	385	1404
32	112	60	2	0	0	0	0	0	0	0	6	69	249

Base — Cooling Degree Days (1)

Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	219	318	585	841	1122	1338	1545	1520	1228	925	524	275	10440
55	10	30	48	191	411	648	832	807	538	228	49	14	3806
57	4	23	30	151	352	588	770	745	482	179	33	9	3366
60	1	15	14	101	268	498	677	652	397	115	17	3	2758
65	0	0	1	41	149	350	522	497	267	45	4	0	1876
70	0	0	0	12	65	214	368	346	162	12	0	0	1179

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	69	160	349	591	864	1096	1295	1266	979	663	294	100	69	229	578	1169	2033	3129	4424	5690	6669	7332	7626	7726
45	30	88	230	446	709	946	1140	1111	829	511	188	44	30	118	348	794	1503	2449	3589	4700	5529	6040	6228	6272
50	6	42	131	308	554	796	985	956	679	362	105	21	6	48	179	487	1041	1837	2822	3778	4457	4819	4924	4945
55	1	15	64	188	403	646	830	801	533	233	49	5	1	16	80	268	671	1317	2147	2948	3481	3714	3763	3768
60	0	5	27	97	261	496	675	646	394	125	19	0	0	5	32	129	390	886	1561	2207	2601	2726	2745	2745
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	52	111	224	371	566	756	869	841	650	419	184	71	52	163	387	758	1324	2080	2949	3790	4440	4859	5043	5114

(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