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: SMITH CENTER, KS **COOP ID: 147542**

Climate Division: KS 2 **NWS Call Sign:** **Elevation: 1,780 Feet** **Lat: 39˚47N** **Lon: 98˚47W**

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	37.4	16.2	26.8	79	1990	10	36.8	1992	-26	1959	4	13.7	1979	1185	0	.0	.0	6.7	10.1	29.8	3.3
Feb	44.4	21.2	32.8	85	1972	29	43.0	1999	-17	1981	11	19.2	1978	901	0	.0	.0	11.7	6.5	24.0	2.2
Mar	55.0	30.3	42.7	91+	1978	31	49.9	1986	-18	1960	3	35.9	1975	692	0	.0	.1	20.5	1.6	18.3	.3
Apr	66.8	40.8	53.8	102	1989	22	60.7	1981	14	1994	6	46.4	1983	347	11	.1	.5	27.5	.1	5.6	.0
May	75.7	51.5	63.6	101+	1967	24	68.9	1998	27	1967	2	57.6	1995	127	84	.1	1.7	31.0	.0	.3	.0
Jun	87.1	61.5	74.3	110+	1988	21	80.3	1988	38	1998	6	67.7	1982	13	292	2.3	12.5	30.0	.0	.0	.0
Jul	92.5	66.9	79.7	112	1964	5	86.5	1980	43	1959	1	74.7	1992	0	455	6.4	21.2	31.0	.0	.0	.0
Aug	90.1	65.0	77.6	111+	1983	16	86.3	1983	41	1955	31	71.5	1992	8	397	4.3	18.0	31.0	.0	.0	.0
Sep	81.6	55.6	68.6	105	1976	5	75.4	1998	23	1984	29	63.5	1993	51	158	1.0	8.5	30.0	.0	.3	.0
Oct	69.2	43.0	56.1	97	1997	2	59.3	1975	15+	1993	31	50.8	1976	284	8	.0	.9	29.5	.1	4.2	.0
Nov	50.7	29.1	39.9	87	1980	6	49.6	1999	-6+	1976	28	30.8	1985	753	0	.0	.0	17.6	2.1	19.0	.2
Dec	39.8	19.8	29.8	75	1964	23	36.0	1999	-26	1989	22	11.7	1983	1091	0	.0	.0	7.9	6.9	29.0	1.5
Ann	65.9	41.7	53.8	112	Jul 1964	5	86.5	Jul 1980	-26+	Dec 1989	22	11.7	Dec 1983	5452	1405	14.2	63.4	274.4	27.4	130.5	7.5

\+ 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	.47	.36	1.35	1965	23	1.33	1992	.00	1986
Feb	.53	.44	1.03	1955	4	1.89	1971	.00	1996
Mar	2.01	1.49	2.40	1979	22	6.87	1987	.04	1994
Apr	2.35	2.22	2.38	1987	14	5.05	1984	.00	1989
May	3.89	3.92	2.81	2001	30	10.39	1995	1.15	1976
Jun	3.16	3.05	3.54	1989	11	8.03	1975	.61	1973
Jul	3.25	2.72	3.68	1998	26	12.00	1993	.15	1983
Aug	3.15	3.28	2.91	1963	12	5.98	1977	.38	2000
Sep	2.26	2.19	3.00	1961	12	8.15	1973	.26	1994
Oct	1.64	1.32	3.51	1959	6	4.81	1973	.03	1999
Nov	1.38	1.15	3.20	1996	16	4.93	1996	.00	1989
Dec	.56	.49	1.31	1953	3	1.63	1984	.00+	1976
Ann	24.65	25.12	3.68	Jul 1998	26	12.00	Jul 1993	.00+	Feb 1996

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	3.6	1.5	.2	.0
Feb	3.7	1.4	.3	@
Mar	6.8	4.0	1.2	.4
Apr	7.8	4.6	1.5	.5
May	11.4	7.3	2.7	.9
Jun	9.2	5.7	2.2	.8
Jul	8.6	5.3	2.3	.9
Aug	7.8	5.0	2.5	1.0
Sep	6.4	4.0	1.6	.5
Oct	5.4	3.2	1.0	.4
Nov	5.2	2.8	.8	.3
Dec	3.5	1.7	.2	.0
Ann	79.4	46.5	16.5	5.7

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	.02	.05	.12	.18	.26	.35	.45	.58	.76	1.06	1.36
Feb	.00	.02	.07	.14	.22	.32	.45	.63	.88	1.33	1.79
Mar	.11	.22	.46	.73	1.04	1.41	1.85	2.42	3.23	4.60	5.97
Apr	.57	.91	1.29	1.60	1.88	2.17	2.49	2.85	3.32	4.05	4.71
May	1.21	1.58	2.13	2.60	3.06	3.53	4.05	4.66	5.45	6.68	7.81
Jun	.78	1.08	1.54	1.95	2.35	2.78	3.26	3.83	4.57	5.75	6.85
Jul	.41	.67	1.13	1.58	2.06	2.59	3.21	3.97	5.00	6.69	8.33
Aug	.88	1.18	1.63	2.03	2.41	2.81	3.26	3.79	4.47	5.55	6.55
Sep	.30	.49	.81	1.13	1.46	1.82	2.24	2.77	3.47	4.62	5.73
Oct	.13	.24	.46	.68	.94	1.22	1.56	1.99	2.59	3.59	4.57
Nov	.04	.14	.33	.53	.75	1.00	1.31	1.69	2.22	3.11	4.00
Dec	.00	.03	.11	.19	.28	.39	.52	.69	.92	1.32	1.71
Ann	16.18	17.77	19.84	21.42	22.85	24.23	25.67	27.27	29.23	32.09	34.59

+ 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	3.7	2.9	1	1
Feb	3.8	2.3	1	#
Mar	3.5	1.7	#	#
Apr	.8	.0	#	#
May	#	.0	0	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.2	.0	#	0
Oct	.5	.0	#	0
Nov	2.2	1.0	#	#
Dec	3.1	2.4	1	#
Ann	17.8	10.3	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	7.5	1971	3	14.9	1993	12	1993	21	7	1993
Feb	9.2	1980	8	11.4	1997	10	1980	9	5	1985
Mar	8.0	1984	19	12.5	1987	9	1987	30	2	1971
Apr	4.0	1977	4	8.0	1997	6	1997	12	1	1997
May	#	1994	1	#	1994	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	4.5	1985	30	5.1	1985	4	1985	30	#	1985
Oct	10.5	1997	26	10.5	1997	11	1997	27	1	1997
Nov	6.0	1991	1	9.5	1975	9	1975	28	2	1991
Dec	4.6	1987	27	10.4	1973	10	1983	31	5	1983
Ann	10.5	Oct 1997	26	14.9	Jan 1993	12	Jan 1993	21	7	Jan 1993

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	3.4	1.4	.3	.1	.0
Feb	2.5	1.0	.4	.2	.0
Mar	2.1	1.1	.4	.1	.0
Apr	.5	.3	.1	.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	.1	@	@	.0	.0
Oct	.1	.1	@	@	@
Nov	1.6	.8	.2	.1	.0
Dec	2.4	1.2	.4	.0	.0
Ann	12.7	5.9	1.8	.5	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	10.1	5.2	2.8	.3
Feb	7.2	5.0	2.5	.3
Mar	3.1	1.7	.7	.0
Apr	.4	.2	@	.0
May	.0	.0	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.1	@	.0	.0
Oct	.2	.1	.1	.1
Nov	2.6	1.2	.6	.0
Dec	6.1	2.8	.9	.1
Ann	29.8	16.2	7.6	.8

+ 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	5/13	5/10	5/07	5/04	5/02	4/30	4/28	4/25	4/21
32	5/06	5/01	4/28	4/25	4/22	4/19	4/15	4/12	4/07
28	4/21	4/17	4/13	4/11	4/08	4/06	4/03	3/31	3/27
24	4/12	4/07	4/04	4/01	3/30	3/27	3/24	3/21	3/16
20	4/06	3/31	3/27	3/23	3/19	3/16	3/12	3/08	3/02
16	4/02	3/24	3/18	3/13	3/08	3/04	2/26	2/20	2/12

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	9/16	9/21	9/24	9/27	9/30	10/03	10/05	10/09	10/13
32	9/27	10/02	10/06	10/09	10/11	10/14	10/17	10/21	10/26
28	10/03	10/08	10/12	10/16	10/19	10/22	10/26	10/30	11/04
24	10/15	10/20	10/24	10/27	10/31	11/03	11/06	11/10	11/15
20	10/29	11/04	11/08	11/11	11/14	11/18	11/21	11/25	11/30
16	11/02	11/08	11/12	11/16	11/19	11/23	11/26	12/01	12/06

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	166	161	157	153	150	147	143	139	133
32	195	187	181	177	172	168	163	157	149
28	217	208	203	198	193	188	183	178	169
24	235	228	223	218	214	210	206	201	194
20	265	256	250	244	239	234	229	223	214
16	287	276	268	262	255	249	242	234	223

***** 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	1185	901	692	347	127	13	0	8	51	284	753	1091	5452
60	1030	769	539	222	57	2	0	1	15	158	603	936	4332
57	938	691	453	161	31	0	0	0	5	100	518	843	3740
55	877	639	396	125	19	0	0	0	2	71	463	781	3373
50	729	514	266	58	4	0	0	0	0	26	331	636	2564
32	276	181	27	0	0	0	0	0	0	0	50	204	738

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	114	204	358	654	980	1269	1478	1413	1097	747	288	137	8739
55	2	17	13	90	286	579	765	700	409	105	10	0	2976
57	1	14	9	65	236	519	703	638	353	72	5	0	2615
60	0	8	2	37	169	431	610	545	272	37	0	0	2111
65	0	0	0	11	84	292	455	397	158	8	0	0	1405
70	0	0	0	2	32	173	307	261	79	1	0	0	855

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	15	67	197	436	747	1043	1249	1184	878	529	135	21	15	82	279	715	1462	2505	3754	4938	5816	6345	6480	6501
45	1	27	115	308	592	893	1094	1029	728	381	68	2	1	28	143	451	1043	1936	3030	4059	4787	5168	5236	5238
50	0	7	58	189	439	743	939	874	580	253	24	0	0	7	65	254	693	1436	2375	3249	3829	4082	4106	4106
55	0	1	22	106	296	593	784	719	441	142	8	0	0	1	23	129	425	1018	1802	2521	2962	3104	3112	3112
60	0	0	4	50	174	445	629	564	307	68	0	0	0	0	4	54	228	673	1302	1866	2173	2241	2241	2241
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	23	66	150	283	468	686	817	779	566	340	97	27	23	89	239	522	990	1676	2493	3272	3838	4178	4275	4302

(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