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: TUTTLE CREEK LAKE, KS **COOP ID: 148259**

Climate Division: KS 3 **NWS Call Sign:** **Elevation: 1,057 Feet** **Lat: 39˚15N** **Lon: 96˚36W**

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	36.5	14.1	25.3	73	1981	25	35.9	1990	-20	1974	12	11.5	1979	1231	0	.0	.0	5.8	11.6	29.9	4.3
Feb	42.9	19.2	31.1	79	1972	29	41.1	1976	-20+	1979	1	16.2	1979	952	0	.0	.0	9.5	7.4	24.8	2.8
Mar	54.3	29.9	42.1	90	1967	30	47.6	1986	-16	1978	4	34.4	1975	710	0	.0	.0	18.9	1.7	18.7	.3
Apr	65.1	40.5	52.8	97	1989	28	60.9	1981	2	1975	3	45.4	1983	377	10	.0	.4	26.8	.1	6.6	.0
May	74.5	50.8	62.7	100	1967	25	68.6	1977	26	1976	3	56.4	1995	153	80	.0	1.0	30.9	.0	.4	.0
Jun	84.2	60.8	72.5	111	1980	28	77.0	1988	39	1964	1	66.8	1982	19	244	.6	7.6	30.0	.0	.0	.0
Jul	89.9	66.2	78.1	111	1980	15	85.7	1980	42	1972	5	73.7	1994	0	405	3.3	16.2	31.0	.0	.0	.0
Aug	88.6	63.7	76.2	110	1983	17	83.5	1983	44	1974	4	70.6	1992	8	353	2.5	14.7	31.0	.0	.0	.0
Sep	80.2	54.0	67.1	107	2000	3	72.6	1998	29	1984	30	60.6	1974	71	134	.6	6.2	29.9	.0	.4	.0
Oct	68.7	41.1	54.9	96	1963	6	59.5	1971	11	1993	31	48.4	1976	320	7	.0	.5	29.2	.0	5.8	.0
Nov	52.5	29.1	40.8	83+	1990	2	48.9	1999	-5	1976	28	34.2	1976	727	0	.0	.0	17.7	1.7	19.4	.1
Dec	40.4	18.5	29.5	74	1995	1	34.2+	1999	-28	1989	24	12.2	1983	1101	0	.0	.0	7.7	7.5	28.9	2.1
Ann	64.8	40.7	52.8	111+	Jul 1980	15	85.7	Jul 1980	-28	Dec 1989	24	11.5	Jan 1979	5669	1233	7.0	46.6	268.4	30.0	134.9	9.6

\+ 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: 1959-2001

(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	.57	.50	1.43	1965	2	1.62	1979	.00	1986
Feb	.90	.75	1.32	2001	25	2.81	2000	.00	1991
Mar	2.32	2.05	2.21	1980	30	6.86	1973	.06	1997
Apr	2.85	2.32	2.72	1967	1	9.32	1999	.21	1989
May	4.57	4.08	5.06	1977	20	12.05	1995	1.17	1992
Jun	4.69	4.56	5.75	1977	18	11.43	1977	2.10	1997
Jul	3.85	3.02	5.20	1968	24	16.11	1993	.00+	1983
Aug	3.34	2.98	3.80	1960	18	9.39	1977	.00	1971
Sep	3.54	2.85	7.05	1972	7	9.19	1973	.39	1994
Oct	2.70	2.38	5.18	1973	11	6.87	1979	.00	1975
Nov	1.89	1.43	2.48	1964	16	5.13	1998	.00+	1989
Dec	.87	.58	1.80	1980	8	3.02	1980	.00+	1977
Ann	32.09	31.30	7.05	Sep 1972	7	16.11	Jul 1993	.00+	Feb 1991

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	3.8	1.9	.3	.0
Feb	3.9	2.5	.5	.1
Mar	6.6	4.7	1.6	.6
Apr	9.0	5.5	1.7	.6
May	10.6	7.5	3.1	1.3
Jun	9.7	6.4	2.9	1.5
Jul	8.2	5.6	2.6	1.1
Aug	7.9	5.3	2.1	1.0
Sep	7.6	4.8	2.3	1.0
Oct	6.7	4.4	1.7	.7
Nov	5.7	3.4	1.3	.4
Dec	3.5	1.9	.5	.1
Ann	83.2	53.9	20.6	8.4

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	.03	.08	.17	.25	.34	.44	.56	.71	.90	1.23	1.55
Feb	.07	.17	.31	.45	.58	.73	.90	1.11	1.39	1.84	2.28
Mar	.31	.50	.83	1.15	1.49	1.87	2.30	2.83	3.56	4.74	5.88
Apr	.53	.78	1.20	1.59	1.98	2.41	2.89	3.48	4.25	5.51	6.70
May	1.30	1.73	2.39	2.96	3.51	4.10	4.74	5.50	6.48	8.03	9.47
Jun	1.94	2.37	2.97	3.47	3.93	4.41	4.91	5.50	6.24	7.37	8.39
Jul	.00	.65	1.42	2.04	2.64	3.27	3.99	4.81	5.93	7.72	9.43
Aug	.50	.94	1.51	1.97	2.44	2.92	3.46	4.10	4.94	6.26	7.51
Sep	.67	.99	1.51	1.98	2.47	2.99	3.59	4.31	5.26	6.79	8.24
Oct	.07	.24	.60	.98	1.41	1.92	2.52	3.29	4.37	6.19	8.00
Nov	.00	.15	.45	.75	1.06	1.41	1.83	2.34	3.05	4.23	5.38
Dec	.00	.03	.14	.27	.41	.58	.79	1.06	1.44	2.09	2.75
Ann	20.51	22.66	25.46	27.62	29.57	31.47	33.44	35.65	38.35	42.31	45.78

\+ 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: 1959-2001
(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	4.2	3.1	1	#
Feb	3.1	2.0	1	#
Mar	1.6	.0	#	0
Apr	.1	.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	.5	.0	#	0
Dec	1.3	.3	1	#
Ann	10.8	5.4	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	1979	13	17.7	1979	12	1979	18	7	1985
Feb	10.0	1971	22	15.0	1971	11	1983	2	7	1979
Mar	9.0	1975	10	9.0	1975	7	1998	12	1	1998
Apr	1.0	1997	12	1.0	1997	1	1997	12	#+	1997
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	1	1991	31	#	1991
Nov	6.0	1975	26	6.0	1975	6	1975	26	#+	1992
Dec	9.0	1973	30	9.0	1973	12	1973	31	5	1983
Ann	10.0	Feb 1971	22	17.7	Jan 1979	12+	Jan 1979	18	7+	Jan 1985

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	1.6	1.2	.2	.1	.0
Feb	1.3	.9	.2	.1	@
Mar	.5	.4	.2	.1	.0
Apr	.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	.3	.2	@	@	.0
Dec	1.1	.9	.2	@	.0
Ann	4.9	3.6	.8	.3	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	5.5	2.5	1.1	.4
Feb	1.7	.5	.2	.0
Mar	.6	.2	.2	.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	.2	@	@	.0
Dec	2.0	.5	.1	.1
Ann	10.0	3.7	1.6	.5

+ 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	5/18	5/13	5/09	5/06	5/04	5/01	4/28	4/24	4/19
32	5/09	5/05	5/02	4/29	4/26	4/24	4/21	4/18	4/14
28	4/25	4/21	4/17	4/15	4/12	4/09	4/06	4/03	3/30
24	4/13	4/09	4/06	4/03	4/01	3/29	3/27	3/24	3/20
20	4/07	4/01	3/28	3/25	3/22	3/19	3/16	3/12	3/07
16	3/26	3/19	3/15	3/11	3/07	3/03	2/27	2/22	2/15

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	9/17	9/22	9/25	9/27	9/30	10/02	10/05	10/08	10/12
32	9/23	9/28	10/03	10/06	10/10	10/13	10/17	10/21	10/27
28	10/08	10/13	10/17	10/20	10/22	10/25	10/28	11/01	11/06
24	10/18	10/23	10/27	10/31	11/03	11/06	11/09	11/13	11/19
20	10/28	11/03	11/08	11/11	11/15	11/19	11/22	11/27	12/03
16	11/06	11/13	11/17	11/21	11/25	11/28	12/02	12/07	12/13

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	169	162	157	152	148	144	140	135	128
32	186	179	174	170	166	162	157	152	146
28	213	206	201	197	193	189	185	180	173
24	237	229	224	219	215	211	207	201	194
20	262	254	247	242	237	232	227	221	212
16	292	282	275	268	262	256	250	243	232

***** 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	1231	952	710	377	153	19	0	8	71	320	727	1101	5669
60	1076	816	557	249	77	4	0	1	24	191	578	946	4519
57	983	738	471	185	46	1	0	0	11	127	492	853	3907
55	922	686	414	148	31	0	0	0	6	93	437	792	3529
50	773	558	283	74	9	0	0	0	0	36	306	647	2686
32	309	207	33	0	0	0	0	0	0	0	39	214	802

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	100	179	345	623	950	1215	1428	1369	1053	710	302	135	8409
55	1	14	13	81	267	525	715	656	369	90	10	0	2741
57	0	10	9	58	221	466	653	594	314	62	5	0	2392
60	0	4	2	33	159	379	560	502	238	33	0	0	1910
65	0	0	0	10	80	244	405	353	134	7	0	0	1233
70	0	0	0	2	31	133	260	220	63	1	0	0	710

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	10	57	181	413	718	991	1195	1135	826	481	148	25	10	67	248	661	1379	2370	3565	4700	5526	6007	6155	6180
45	1	26	104	282	563	841	1040	980	677	342	80	7	1	27	131	413	976	1817	2857	3837	4514	4856	4936	4943
50	0	8	53	178	411	691	885	825	530	222	38	1	0	8	61	239	650	1341	2226	3051	3581	3803	3841	3842
55	0	1	23	100	275	541	730	670	393	126	13	0	0	1	24	124	399	940	1670	2340	2733	2859	2872	2872
60	0	0	6	49	158	393	575	515	266	59	2	0	0	0	6	55	213	606	1181	1696	1962	2021	2023	2023
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	19	58	137	257	450	658	798	751	536	318	107	30	19	77	214	471	921	1579	2377	3128	3664	3982	4089	4119

(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