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: COUNCIL GROVE LAKE, KS **COOP ID: 141867**

Climate Division: KS 6 **NWS Call Sign:** **Elevation: 1,320 Feet** **Lat: 38˚41N** **Lon: 96˚32W**

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	36.9	15.5	26.2	76	1990	11	36.6	1990	-17	1985	20	11.8	1979	1204	0	.0	.0	6.2	11.7	29.7	3.4
Feb	43.5	20.8	32.2	80+	1981	21	42.8	1976	-23	1979	1	16.4	1979	921	0	.0	.0	10.0	7.4	23.4	2.4
Mar	54.9	31.2	43.1	88	1967	30	48.2	1986	-9	1978	4	34.6	1975	681	0	.0	.0	19.5	2.0	16.9	.1
Apr	65.6	42.1	53.9	95+	1989	27	62.0	1981	6	1975	3	46.1	1983	346	12	.0	.4	27.0	@	3.8	.0
May	74.9	52.5	63.7	99	1998	31	69.0	1998	30+	1994	1	58.1	1995	125	84	.0	.9	30.9	.0	.2	.0
Jun	84.5	61.7	73.1	112	1980	28	77.7	1980	41+	1983	1	68.2	1992	13	257	.4	6.9	30.0	.0	.0	.0
Jul	90.6	66.9	78.8	114	1980	11	89.3	1980	46	1972	5	74.3	1971	0	426	2.9	16.2	31.0	.0	.0	.0
Aug	89.3	64.8	77.1	110+	1984	30	84.6	2000	46	1974	4	71.2	1992	8	382	2.7	14.9	31.0	.0	.0	.0
Sep	80.8	55.3	68.1	108	2000	3	74.3	1998	28	1984	30	59.9	1974	63	154	.7	6.3	29.9	.0	.2	.0
Oct	69.2	42.9	56.1	94+	1976	2	60.2	1971	15	1993	31	50.3	1976	287	10	.0	.5	29.3	.0	4.0	.0
Nov	53.3	30.8	42.1	85	1980	9	51.2	1999	-1+	1976	29	36.1	1976	688	0	.0	.0	18.4	1.6	16.4	.1
Dec	41.0	20.1	30.6	75	1984	29	35.9	1991	-24+	1989	24	12.7	1983	1067	0	.0	.0	8.3	7.3	27.8	1.6
Ann	65.4	42.1	53.8	114	Jul 1980	11	89.3	Jul 1980	-24+	Dec 1989	24	11.8	Jan 1979	5403	1325	6.7	46.1	271.5	30.0	122.4	7.6

\+ 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: 1964-2001

(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	.83	.72	1.15	1971	3	1.84	1979	.00	1986
Feb	.98	.86	2.20	1997	21	3.42	1997	.00	1991
Mar	2.63	2.45	2.52	1995	14	7.95	1973	.22	1971
Apr	3.20	2.87	4.32	1967	1	9.08	1999	.45	1989
May	4.92	4.69	4.38	1971	22	12.44	1995	1.06	1998
Jun	4.25	4.04	5.29	1996	1	7.90	1995	.41	1980
Jul	4.15	3.84	3.67	1983	4	15.23	1993	.00	1975
Aug	3.63	2.95	3.77	1995	15	8.95	1987	.03	1971
Sep	3.10	2.53	2.72	1986	11	9.79	1973	.59	1990
Oct	2.38	2.43	4.20	1973	11	6.10	1974	.19	1999
Nov	2.23	2.28	3.64	1964	16	7.23	1998	.00	1989
Dec	1.20	1.03	2.02	1972	30	3.18	1972	.06	1996
Ann	33.50	33.33	5.29	Jun 1996	1	15.23	Jul 1993	.00+	Feb 1991

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	5.0	2.4	.3	@
Feb	4.7	2.2	.6	.1
Mar	7.6	4.8	2.0	.6
Apr	9.0	5.9	2.3	.8
May	10.6	7.1	3.3	1.5
Jun	9.2	6.1	3.0	1.4
Jul	8.0	5.7	2.8	1.3
Aug	8.5	5.4	2.4	1.1
Sep	6.9	5.2	2.3	1.0
Oct	6.8	4.3	1.5	.7
Nov	6.3	3.8	1.4	.6
Dec	4.8	2.7	.8	.2
Ann	87.4	55.6	22.7	9.3

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	.06	.15	.28	.41	.53	.67	.83	1.03	1.29	1.72	2.13
Feb	.04	.13	.27	.42	.57	.75	.95	1.21	1.56	2.14	2.71
Mar	.36	.58	.95	1.32	1.70	2.12	2.61	3.21	4.02	5.34	6.61
Apr	.67	.97	1.44	1.86	2.29	2.75	3.27	3.89	4.71	6.02	7.26
May	1.30	1.77	2.48	3.11	3.72	4.37	5.09	5.94	7.05	8.79	10.42
Jun	1.17	1.58	2.19	2.72	3.25	3.80	4.40	5.12	6.06	7.52	8.89
Jul	.26	.67	1.32	1.93	2.57	3.29	4.11	5.13	6.50	8.76	10.94
Aug	.45	.74	1.26	1.76	2.30	2.89	3.58	4.43	5.59	7.48	9.32
Sep	.66	.95	1.40	1.81	2.23	2.67	3.17	3.77	4.56	5.82	7.01
Oct	.34	.54	.88	1.21	1.56	1.93	2.37	2.91	3.63	4.81	5.95
Nov	.09	.27	.59	.91	1.27	1.67	2.14	2.74	3.56	4.93	6.28
Dec	.10	.18	.34	.50	.69	.90	1.15	1.46	1.90	2.63	3.35
Ann	20.94	23.26	26.29	28.63	30.74	32.81	34.97	37.38	40.33	44.68	48.50

\+ 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: 1964-2001
(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	4.4	4.1	1	#	11.0	1985	10	17.5	1987	16	1979	31	10	1979	3.6	1.9	.5	.2	@	9.1	5.1	2.8	.7
Feb	3.5	2.0	1	#	12.0	1980	8	12.2	1980	15	1979	1	7	1979	2.3	1.2	.3	.1	.1	5.0	2.7	1.9	.9
Mar	1.4	.5	#	#	7.4	1975	10	7.4	1975	7	1975	10	1	1998	1.1	.6	.1	@	.0	1.2	.3	.1	.0
Apr	.3	.0	#	0	4.0	1975	2	4.0	1975	2	1983	4	#+	1997	.2	.1	@	.0	.0	.2	.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	.3	.0	#	0	8.6	1996	23	8.6	1996	3	1996	23	#	1996	@	@	@	@	.0	@	@	.0	.0
Nov	1.1	.0	#	#	10.0	1975	26	10.0	1975	10	1975	27	1	1975	.7	.4	.1	@	@	.8	.2	.1	.1
Dec	3.3	2.5	1	#	8.0	1978	31	14.3	1983	9	1983	26	4	1983	2.6	1.2	.4	.2	.0	5.0	2.1	.7	.0
Ann	14.3	9.1	N/A	N/A	12.0	Feb 1980	8	17.5	Jan 1987	16	Jan 1979	31	10	Jan 1979	10.5	5.4	1.4	.5	.1	21.3	10.4	5.6	1.7

+ 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	5/11	5/06	5/02	4/29	4/27	4/24	4/21	4/17	4/12
32	5/01	4/25	4/22	4/18	4/15	4/12	4/09	4/05	3/30
28	4/15	4/11	4/09	4/06	4/04	4/02	3/31	3/28	3/24
24	4/08	4/03	3/30	3/27	3/24	3/21	3/18	3/14	3/09
20	4/03	3/27	3/21	3/17	3/12	3/08	3/04	2/26	2/19
16	3/23	3/15	3/09	3/04	2/27	2/23	2/17	2/12	2/03

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	9/19	9/25	9/28	10/01	10/04	10/07	10/11	10/14	10/19
32	9/28	10/03	10/07	10/10	10/13	10/16	10/20	10/24	10/29
28	10/10	10/16	10/20	10/23	10/26	10/29	11/01	11/05	11/10
24	10/21	10/27	11/01	11/05	11/08	11/12	11/16	11/21	11/27
20	11/03	11/09	11/14	11/18	11/22	11/26	11/30	12/04	12/11
16	11/08	11/14	11/19	11/22	11/26	11/29	12/03	12/07	12/14

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	182	174	169	165	160	156	151	146	139
32	205	196	190	185	181	176	171	165	157
28	223	216	212	208	204	200	196	192	185
24	257	247	240	234	229	223	218	211	201
20	285	274	266	260	254	247	241	233	222
16	303	292	284	277	271	264	258	250	239

***** 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	1204	921	681	346	125	13	0	8	63	287	688	1067	5403
60	1049	789	528	222	56	2	0	1	21	163	540	912	4283
57	957	711	442	160	31	0	0	0	9	104	457	819	3690
55	896	659	385	125	19	0	0	0	5	74	402	760	3325
50	751	534	258	58	5	0	0	0	0	26	277	616	2525
32	295	198	27	0	0	0	0	0	0	0	33	198	751

Base — Cooling Degree Days (1)

Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	115	201	369	656	982	1234	1449	1397	1081	746	335	154	8719
55	3	18	15	91	288	544	736	684	395	107	14	3	2898
57	1	14	10	66	237	484	674	622	340	75	9	0	2532
60	0	9	2	38	170	396	581	530	262	40	2	0	2030
65	0	0	0	12	84	257	426	382	154	10	0	0	1325
70	0	0	0	2	31	142	282	247	77	1	0	0	782

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	14	70	205	434	737	997	1204	1155	852	520	177	36	14	84	289	723	1460	2457	3661	4816	5668	6188	6365	6401
45	4	32	119	301	582	847	1049	1000	703	375	98	12	4	36	155	456	1038	1885	2934	3934	4637	5012	5110	5122
50	0	10	62	191	429	697	894	845	556	247	48	4	0	10	72	263	692	1389	2283	3128	3684	3931	3979	3983
55	0	2	31	109	287	547	739	690	414	145	18	0	0	2	33	142	429	976	1715	2405	2819	2964	2982	2982
60	0	0	9	52	169	400	584	535	287	72	4	0	0	0	9	61	230	630	1214	1749	2036	2108	2112	2112
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	24	63	141	262	454	668	812	770	550	329	116	34	24	87	228	490	944	1612	2424	3194	3744	4073	4189	4223

(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