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: GLEN ELDER LAKE, KS **COOP ID: 143100**

Climate Division: KS 2 **NWS Call Sign:** **Elevation: 1,500 Feet** **Lat: 39˚30N** **Lon: 98˚19W**

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	37.2	13.9	25.6	71	1968	26	35.6	1992	-22+	1974	5	11.9	1979	1224	0	.0	.0	6.3	11.6	30.7	4.4
Feb	43.8	18.5	31.2	81+	1972	29	41.3	1999	-16+	1988	6	17.4	1979	948	0	.0	.0	10.1	7.8	26.0	3.2
Mar	54.3	28.2	41.3	88	1967	24	47.7	1986	-10+	1978	5	33.7	1996	735	0	.0	.0	18.7	2.1	21.2	.5
Apr	65.2	38.9	52.1	100	1989	25	61.0	1981	13	1975	3	45.4	1983	395	8	@	.3	26.2	.1	7.1	.0
May	74.6	49.8	62.2	100+	1967	25	68.7	1977	24	1967	2	55.9	1995	155	69	.0	1.0	30.8	.0	.4	.0
Jun	85.8	60.0	72.9	108	1988	21	79.1	1988	41+	1983	1	67.2	1982	18	255	1.0	9.2	30.0	.0	.0	.0
Jul	92.3	66.0	79.2	111+	1980	12	85.9	1980	46	1971	30	74.5	1992	0	438	4.6	18.8	31.0	.0	.0	.0
Aug	90.1	63.7	76.9	109+	1983	18	86.1	1983	43	1967	27	70.6	1992	11	379	3.2	15.6	31.0	.0	.0	.0
Sep	81.9	54.0	68.0	107	2000	3	73.4	1998	25	1984	29	62.2	1993	54	143	.6	7.2	29.8	.0	.3	.0
Oct	69.7	41.1	55.4	95+	2000	2	59.0	2000	14	1993	31	50.4	1976	304	6	.0	.6	29.2	@	5.3	.0
Nov	52.7	28.2	40.5	83	1980	9	49.0	1999	-9	1976	28	32.5	1985	737	0	.0	.0	17.3	1.8	21.1	.2
Dec	41.1	18.7	29.9	82	1964	24	35.8	1988	-27+	1989	23	11.8	1983	1089	0	.0	.0	8.2	7.7	29.9	2.2
Ann	65.7	40.1	52.9	111+	Jul 1980	12	86.1	Aug 1983	-27+	Dec 1989	23	11.8	Dec 1983	5670	1298	9.4	52.7	268.6	31.1	142.0	10.5

+ 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: 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	.62	.54	.99	1965	23	1.62	1979	.00+	1997
Feb	.61	.55	1.13	2001	9	1.93	1993	.00	1996
Mar	2.06	1.60	3.09	1987	23	7.24	1973	.00	1994
Apr	2.31	1.91	3.42	1987	14	5.08	1984	.07	1989
May	3.69	3.28	2.42	2001	5	10.20	1995	.73	1997
Jun	3.66	3.36	5.03	1989	11	9.01	1989	1.07	1980
Jul	3.90	2.85	3.89	1993	5	19.09	1993	.10	1983
Aug	2.96	2.88	2.46	1996	26	8.13	1977	.24	1971
Sep	2.38	1.78	3.37	1986	29	7.52	1973	.56	1974
Oct	1.83	1.57	3.06	1992	8	4.87	1992	.00	1999
Nov	1.49	1.19	4.57	1996	16	6.72	1996	.00	1989
Dec	.76	.53	1.20	1984	16	2.41	1984	.00+	1996
Ann	26.27	25.34	5.03	Jun 1989	11	19.09	Jul 1993	.00+	Oct 1999

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	3.7	1.7	.4	.0
Feb	4.2	1.6	.3	.0
Mar	6.5	3.7	1.3	.6
Apr	7.8	4.9	1.4	.5
May	11.3	7.0	2.6	.9
Jun	9.1	6.0	2.6	.9
Jul	8.3	5.3	2.9	1.0
Aug	8.1	4.9	2.2	.8
Sep	6.9	4.7	1.3	.5
Oct	5.7	3.4	1.0	.4
Nov	5.4	2.9	.7	.2
Dec	3.7	1.8	.5	.1
Ann	80.7	47.9	17.2	5.9

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	.07	.18	.28	.38	.49	.62	.77	.98	1.32	1.65
Feb	.01	.03	.10	.18	.28	.40	.54	.73	1.01	1.48	1.95
Mar	.11	.30	.61	.92	1.24	1.60	2.02	2.54	3.25	4.42	5.56
Apr	.51	.72	1.06	1.36	1.67	1.99	2.36	2.80	3.38	4.30	5.16
May	.95	1.30	1.83	2.31	2.77	3.26	3.81	4.46	5.30	6.63	7.88
Jun	1.05	1.40	1.92	2.38	2.82	3.28	3.79	4.40	5.18	6.40	7.54
Jul	.25	.48	.97	1.50	2.10	2.80	3.64	4.72	6.23	8.78	11.31
Aug	.58	.84	1.28	1.68	2.08	2.52	3.01	3.60	4.39	5.65	6.85
Sep	.51	.72	1.07	1.39	1.71	2.05	2.43	2.89	3.50	4.47	5.39
Oct	.07	.21	.47	.74	1.03	1.36	1.75	2.24	2.92	4.06	5.17
Nov	.03	.11	.30	.50	.74	1.02	1.36	1.80	2.42	3.48	4.54
Dec	.00	.04	.15	.27	.39	.54	.71	.93	1.24	1.75	2.26
Ann	15.24	17.20	19.81	21.86	23.71	25.54	27.46	29.61	32.27	36.21	39.70

\+ 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)

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median
Jan	5.1	4.0	2	1
Feb	2.9	1.6	1	#
Mar	2.6	1.0	#	#
Apr	.3	.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	.1	.0	#	0
Nov	1.4	.0	#	#
Dec	2.3	1.8	1	#
Ann	14.7	8.4	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	10.0	1985	10	16.5	1985	16	1993	22	9	1993
Feb	10.0	1971	22	10.0	1971	13	1985	7	7	1985
Mar	10.0	1975	10	10.3	1975	8	1987	30	4	1978
Apr	3.0	1997	12	5.5	1997	8	1997	12	1	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	2.0	1997	26	2.0	1997	2	1997	26	#+	1997
Nov	8.0	1991	1	8.0	1991	8	1991	4	2	1991
Dec	4.0	1986	2	8.0	1986	17	1983	30	9	1983
Ann	10.0+	Jan 1985	10	16.5	Jan 1985	17	Dec 1983	30	9+	Jan 1993

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	2.2	1.5	.5	.2	@
Feb	1.7	1.2	.3	.1	@
Mar	1.1	.8	.3	.1	@
Apr	.2	.2	@	.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	.1	@	.0	.0	.0
Nov	.9	.8	.1	.1	.0
Dec	1.5	1.0	.3	.0	.0
Ann	7.7	5.5	1.5	.5	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	7.8	4.7	3.2	1.4
Feb	5.7	3.7	2.8	.6
Mar	1.5	.7	.5	.0
Apr	.1	.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	.1	.0	.0	.0
Nov	1.3	.6	.4	.0
Dec	2.8	.7	.1	.0
Ann	19.3	10.4	7.0	2.0

+ 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	5/16	5/11	5/07	5/04	5/01	4/28	4/25	4/21	4/16
32	5/08	5/03	4/29	4/26	4/23	4/20	4/17	4/13	4/08
28	4/27	4/23	4/19	4/16	4/14	4/11	4/08	4/04	3/31
24	4/12	4/08	4/06	4/03	4/01	3/30	3/27	3/25	3/21
20	4/08	4/02	3/28	3/25	3/21	3/18	3/14	3/09	3/03
16	4/01	3/25	3/19	3/15	3/10	3/06	3/01	2/24	2/16

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	9/15	9/21	9/25	9/28	10/01	10/04	10/07	10/11	10/16
32	9/30	10/05	10/08	10/11	10/14	10/17	10/20	10/23	10/28
28	10/10	10/15	10/20	10/23	10/27	10/30	11/03	11/07	11/13
24	10/19	10/25	10/29	11/02	11/05	11/09	11/12	11/16	11/22
20	10/24	10/31	11/05	11/09	11/13	11/17	11/21	11/26	12/03
16	11/06	11/12	11/17	11/21	11/25	11/29	12/03	12/08	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	173	166	161	156	152	148	144	139	132
32	191	185	181	177	173	170	166	162	156
28	216	209	204	199	195	191	187	182	175
24	239	232	226	222	218	213	209	203	196
20	263	254	247	242	236	231	226	219	210
16	288	278	271	265	259	253	247	240	230

***** 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	1224	948	735	395	155	18	0	11	54	304	737	1089	5670
60	1069	815	581	264	76	4	0	2	15	175	587	934	4522
57	976	737	495	197	44	1	0	0	5	114	502	841	3912
55	915	684	437	158	29	0	0	0	2	82	447	780	3534
50	767	558	303	80	8	0	0	0	0	31	316	635	2698
32	306	211	38	0	0	0	0	0	0	0	43	207	805

Base — Cooling Degree Days (1)

Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	105	187	326	602	937	1227	1461	1392	1079	726	297	142	8481
55	2	16	12	70	253	538	748	679	390	94	10	1	2813
57	0	12	8	49	206	479	686	617	334	64	5	0	2460
60	0	7	1	27	145	391	593	525	254	33	0	0	1976
65	0	0	0	8	69	255	438	379	143	6	0	0	1298
70	0	0	0	1	25	144	290	247	68	1	0	0	776

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	55	160	373	682	984	1206	1137	827	480	127	21	10	65	225	598	1280	2264	3470	4607	5434	5914	6041	6062
45	0	20	88	246	529	834	1051	982	680	339	68	4	0	20	108	354	883	1717	2768	3750	4430	4769	4837	4841
50	0	5	44	147	378	685	896	827	532	215	25	1	0	5	49	196	574	1259	2155	2982	3514	3729	3754	3755
55	0	0	12	79	244	535	741	672	394	118	7	0	0	0	12	91	335	870	1611	2283	2677	2795	2802	2802
60	0	0	1	33	133	388	586	517	268	53	0	0	0	0	1	34	167	555	1141	1658	1926	1979	1979	1979
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	19	64	130	245	419	640	793	746	530	313	101	29	19	83	213	458	877	1517	2310	3056	3586	3899	4000	4029

(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