

Climatography of the United States

No. 20

1971-2000

Station: LIBERAL, KS

COOP ID: 144695

Climate Division: KS 7

NWS Call Sign:

Elevation: 2,834 Feet Lat: 37°01N

Lon: 100°56W

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	45.7	18.7	32.2	84	1986	21	41.4	1986	-17	1959	4	18.4	1979	1017	0	.0	.0	14.6	5.8	29.2	1.2
Feb	51.6	22.8	37.2	87+	1981	21	44.8	1976	-13	1951	1	24.3	1978	778	0	.0	.0	17.1	3.6	22.8	.7
Mar	59.9	29.6	44.8	93	1989	11	51.6	1972	-11	1948	11	36.8	1998	628	0	.0	.1	24.8	1.0	16.4	.0
Apr	69.6	39.2	54.4	103	1989	23	62.0	1981	12+	1975	3	47.7	1997	335	15	@	1.2	28.1	.1	4.7	.0
May	77.5	49.6	63.6	105	1974	28	68.9	1998	28+	1954	3	57.5	1978	130	84	.4	4.6	30.7	.0	.1	.0
Jun	88.6	60.2	74.4	114+	1981	10	79.4	1994	38+	1947	13	67.9	1989	15	297	3.9	16.0	30.0	.0	.0	.0
Jul	93.6	65.1	79.4	112	1981	22	86.0	1980	49	1952	8	76.4	1972	0	445	8.0	24.8	31.0	.0	.0	.0
Aug	91.8	63.9	77.9	109+	1984	30	84.3	1983	48	1950	20	71.6	1992	3	402	5.7	22.5	31.0	.0	.0	.0
Sep	83.5	55.7	69.6	108	1945	4	75.2	1998	29	1985	30	61.9	1974	43	180	1.5	11.4	29.7	.0	.2	.0
Oct	72.6	43.1	57.9	98+	2000	2	61.9	1979	16	1993	30	53.6	1976	235	14	.0	2.3	29.9	.1	2.5	.0
Nov	57.3	29.9	43.6	87	1998	22	50.6	1999	-2	1976	28	36.9	1991	641	0	.0	.0	22.0	.9	17.4	@
Dec	47.5	21.6	34.6	85	1955	24	39.5	1975	-13	1989	23	22.9	1983	945	0	.0	.0	15.9	4.1	28.5	1.1
Ann	69.9	41.6	55.8	114+	Jun 1981	10	86.0	Jul 1980	-17	Jan 1959	4	18.4	Jan 1979	4770	1437	19.5	82.9	304.8	15.6	121.8	3.0

+ 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/normal/usnormals.html

Issue Date: February 2004

(1) From the 1971-2000 Monthly Normals

(2) Derived from station's available digital record: 1939-2001

(3) Derived from 1971-2000 serially complete daily data

061-A

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No. 20 1971-2000

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801
www.ncdc.noaa.gov

Station: LIBERAL, KS

COOP ID: 144695

Climate Division: KS 7

NWS Call Sign:

Elevation: 2,834 Feet Lat: 37°01N

Lon: 100°56W

Precipitation (inches)																								
	Precipitation Totals									Mean Number of Days (3)				Precipitation Probabilities (1) Probability that the monthly/annual precipitation will be equal to or less than the indicated amount										
	Means/ Medians(1)		Extremes							Daily Precipitation				Monthly/Annual Precipitation vs Probability Levels These values were determined from the incomplete gamma distribution										
Month	Mean	Med- ian	Highest Daily(2)	Year	Day	Highest Monthly(1)	Year	Lowest Monthly(1)	Year	>= 0.01	>= 0.10	>= 0.50	>= 1.00	.05	.10	.20	.30	.40	.50	.60	.70	.80	.90	.95
Jan	.54	.41	1.23	1990	19	1.95	1980	.00+	1998	3.1	1.8	.2	@	.00	.00	.14	.23	.32	.42	.54	.68	.86	1.17	1.46
Feb	.56	.43	1.75	1990	21	2.33	1983	.00+	2000	3.1	1.5	.3	.1	.00	.00	.03	.10	.18	.30	.44	.65	.95	1.49	2.04
Mar	1.51	1.00	1.93	1961	17	9.00	1973	.00	1997	5.0	3.3	.9	.3	.02	.08	.24	.43	.67	.96	1.32	1.79	2.48	3.66	4.86
Apr	1.57	1.38	2.59	1970	18	4.24	1988	.05	1996	5.3	3.3	1.2	.3	.11	.21	.41	.62	.86	1.14	1.48	1.90	2.50	3.50	4.49
May	3.12	2.75	8.00	1991	22	8.83	1991	.78	1985	7.8	5.1	2.1	.5	.79	1.08	1.53	1.93	2.33	2.75	3.22	3.77	4.49	5.64	6.71
Jun	2.71	2.30	2.76	1982	18	7.60	1989	.17	1998	7.4	4.8	2.0	.7	.41	.63	1.02	1.40	1.79	2.22	2.71	3.31	4.12	5.44	6.70
Jul	2.92	2.69	3.19	1961	21	6.34	1996	.21	1983	6.6	4.8	2.1	.8	.67	.94	1.37	1.75	2.14	2.54	3.00	3.54	4.26	5.39	6.46
Aug	2.11	1.76	2.93	1997	7	6.78	1974	.12	1990	6.5	3.9	1.5	.4	.23	.39	.69	.98	1.30	1.65	2.07	2.58	3.28	4.44	5.57
Sep	1.80	1.22	3.12	1985	19	6.39	1985	.00	1980	5.4	3.1	1.1	.4	.06	.20	.45	.71	1.00	1.33	1.72	2.21	2.88	4.02	5.14
Oct	1.44	.77	6.73	1998	1	10.62	1998	.00+	1989	4.1	2.3	.9	.3	.00	.02	.13	.29	.51	.80	1.17	1.67	2.41	3.72	5.08
Nov	.91	.57	1.92+	1992	25	3.59	1972	.00+	1999	3.9	2.1	.6	.2	.00	.00	.13	.27	.42	.61	.83	1.12	1.51	2.20	2.88
Dec	.54	.38	1.22	1943	9	1.90	1984	.00+	1996	3.5	1.8	.2	@	.00	.04	.12	.21	.30	.40	.52	.66	.87	1.21	1.54
Ann	19.73	20.21	8.00	May 1991	22	10.62	Oct 1998	.00+	Feb 2000	61.7	37.8	13.1	4.0	14.43	15.47	16.79	17.79	18.67	19.52	20.40	21.37	22.54	24.23	25.69

+ 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: 1939-2001

(3) Derived from 1971-2000 serially complete daily data

Complete documentation available from:

www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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Station: LIBERAL, KS

COOP ID: 144695

Climate Division: KS 7

NWS Call Sign:

Elevation: 2,834 Feet

Lat: 37°01N

Lon: 100°56W

Snow (inches)																							
Snow Totals															Mean Number of Days (1)								
Means/Medians (1)					Extremes (2)										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	4.1	3.5	1	#	8.0	1971	3	10.0	1988	10	1971	4	3	1980	2.2	1.7	.5	.1	.0	2.8	1.0	.5	.0
Feb	3.3	1.0	1	#	12.0	1990	21	16.5	1983	14	1983	4	4	1983	1.6	1.1	.4	.1	.1	.8	.3	.2	.1
Mar	5.1	4.8	#	0	10.0	1987	23	14.3	1987	8+	1999	13	1	1999	1.7	1.4	.5	.3	@	1.2	.8	.4	.0
Apr	1.3	.0	#	0	11.5	1983	4	12.5	1983	2	1973	8	#+	1997	.4	.3	.1	.1	@	.1	.0	.0	.0
May	#	.0	0	0	#	1979	4	#	1979	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	.1	.0	#	0	1.9	1984	29	1.9	1984	1	1984	29	#+	1995	@	@	.0	.0	.0	@	.0	.0	.0
Oct	.5	.0	#	0	5.0	1991	31	5.0	1991	5	1991	31	#+	1997	.2	.2	.1	@	.0	.1	.1	@	.0
Nov	1.8	.3	#	0	4.0	1972	21	14.0	1972	17	1992	26	3	1992	.9	.7	.2	.0	.0	.3	.2	@	.0
Dec	3.4	3.0	#	#	7.0	1997	23	13.3	1992	10	1997	24	2	1997	2.1	1.3	.4	.1	.0	1.5	.6	.3	.1
Ann	19.6	12.6	N/A	N/A	12.0	Feb 1990	21	16.5	Feb 1983	17	Nov 1992	26	4	Feb 1983	9.1	6.7	2.2	.7	.1	6.8	3.0	1.4	.2

+ 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

Complete documentation available from:

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Climate Division: KS 7

NWS Call Sign:

Elevation: 2,834 Feet

Lat: 37° 01N

Lon: 100° 56W

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	5/09	5/05	5/01	4/28	4/26	4/23	4/20	4/17	4/12
32	4/29	4/25	4/21	4/18	4/16	4/13	4/10	4/07	4/03
28	4/16	4/11	4/08	4/05	4/02	3/31	3/28	3/24	3/20
24	4/07	4/02	3/30	3/27	3/24	3/22	3/19	3/15	3/11
20	4/01	3/26	3/21	3/17	3/14	3/10	3/06	3/02	2/24
16	3/28	3/19	3/13	3/07	3/02	2/25	2/20	2/13	2/04
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	9/24	9/30	10/05	10/08	10/12	10/15	10/19	10/23	10/29
32	10/07	10/12	10/16	10/19	10/22	10/25	10/28	11/01	11/06
28	10/21	10/25	10/28	10/30	11/02	11/04	11/06	11/09	11/13
24	10/30	11/04	11/08	11/12	11/15	11/18	11/21	11/25	11/30
20	11/04	11/11	11/15	11/19	11/22	11/26	11/29	12/04	12/10
16	11/09	11/16	11/21	11/25	11/29	12/03	12/07	12/12	12/19
Freeze Free Period									
Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	190	183	177	173	168	164	160	154	147
32	208	201	196	192	188	185	181	176	169
28	233	226	221	216	212	208	204	199	191
24	257	249	244	239	235	230	225	220	212
20	280	270	264	258	253	247	242	235	226
16	304	293	285	278	271	264	257	249	238

* 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	1017	778	628	335	130	15	0	3	43	235	641	945	4770
60	862	640	475	214	60	3	0	0	12	120	494	790	3670
57	769	563	390	156	33	1	0	0	4	71	409	697	3093
55	709	510	334	122	20	0	0	0	1	48	355	635	2734
50	564	385	210	57	5	0	0	0	0	14	234	488	1957
32	153	84	10	0	0	0	0	0	0	0	17	93	357

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	159	230	405	671	977	1272	1468	1421	1127	802	366	171	9069
55	2	12	15	103	285	582	755	708	438	137	14	0	3051
57	1	8	9	77	235	522	693	646	381	98	8	0	2678
60	0	2	2	45	169	435	600	553	299	54	3	0	2162
65	0	0	0	15	84	297	445	402	180	14	0	0	1437
70	0	0	0	4	32	179	292	260	93	2	0	0	862

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	53	124	268	491	786	1070	1263	1212	917	592	205	64	53	177	445	936	1722	2792	4055	5267	6184	6776	6981	7045
45	16	57	168	354	633	920	1108	1057	769	440	117	25	16	73	241	595	1228	2148	3256	4313	5082	5522	5639	5664
50	0	24	91	233	481	770	953	902	621	304	55	3	0	24	115	348	829	1599	2552	3454	4075	4379	4434	4437
55	0	7	40	134	334	620	798	747	475	183	18	0	0	7	47	181	515	1135	1933	2680	3155	3338	3356	3356
60	0	0	11	63	209	472	643	592	341	92	3	0	0	0	11	74	283	755	1398	1990	2331	2423	2426	2426
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	73	124	218	330	487	683	816	777	586	385	169	77	73	197	415	745	1232	1915	2731	3508	4094	4479	4648	4725

(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:
www.ncdc.noaa.gov/oa/climate/normal/usnormals.html

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.
Complete documentation for the 1971-2000 Normals is available on the internet from:
www.ncdc.noaa.gov/oa/climate/normal/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 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.

- | | |
|---|---|
| <ol style="list-style-type: none">a. Temperature/ Precipitation Tables<ol style="list-style-type: none">1. 1971-2000 Monthly Normals2. Cooperative Summary of the Day3. National Weather Service station records4. 1971-2000 serially complete daily datab. Degree Day Table<ol style="list-style-type: none">1. Monthly and Annual Heating and Cooling Degree Days Normals to Selected Bases derived from 1971-2000 Monthly Normals2. Daily Normal Growing Degree Units to Selected Base Temperatures derived from 1971-2000 serially complete daily data | <ol style="list-style-type: none">c. Snow Tables<ol style="list-style-type: none">1. Snow Climatology2. Cooperative Summary of the Dayd. Freeze Data Table
1971-2000 serially complete daily data |
|---|---|

References

U.S. Climate Normals 1971-2000, www.ncdc.noaa.gov/normal.html
U.S. Climate Normals 1971-2000-Products Clim20, www.ncdc.noaa.gov/oa/climate/normal/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