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: GREAT BEND, KS **COOP ID: 143218**

Climate Division: KS 5 **NWS Call Sign:** **Elevation: 1,860 Feet** **Lat: 38˚22N** **Lon: 98˚46W**

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	41.6	18.8	30.2	79	1990	10	40.8	1986	-17	1979	31	14.2	1979	1079	0	.0	.0	10.5	7.8	28.2	1.8
Feb	48.7	23.7	36.2	85+	1981	20	45.4	1999	-19	1951	1	22.9	1978	809	0	.0	.0	14.0	4.6	21.6	1.2
Mar	58.4	32.5	45.5	91	1976	25	53.0	1986	-6	1960	3	38.1	1975	606	0	.0	.1	22.7	1.2	15.0	.1
Apr	69.0	42.6	55.8	101	1989	23	64.3	1981	14	1997	12	48.6	1983	296	21	@	.7	28.2	@	3.7	.0
May	77.7	53.2	65.5	102	1964	26	71.0	1998	25	1953	14	58.9	1995	98	113	.1	3.1	31.0	.0	@	.0
Jun	88.3	62.9	75.6	111+	1980	30	80.1	1994	39+	1998	6	69.9	1992	8	327	2.4	14.6	30.0	.0	.0	.0
Jul	93.3	67.9	80.6	111+	1980	14	86.6	1980	45	1952	8	77.3	1972	0	483	6.4	23.4	31.0	.0	.0	.0
Aug	91.2	66.2	78.7	110+	1984	28	85.1	1983	45	1950	20	72.2	1992	3	427	4.7	20.9	31.0	.0	.0	.0
Sep	83.3	57.2	70.3	106	1953	17	76.8	1998	29+	1995	22	63.4	1974	35	192	1.1	9.9	29.8	.0	.2	.0
Oct	72.0	45.2	58.6	98+	1963	2	61.6	1975	16+	1993	31	52.8	1976	215	17	.0	1.0	30.2	@	2.3	.0
Nov	55.0	31.9	43.5	86	1980	6	52.1	1999	-4	1952	28	35.3	1985	647	0	.0	.0	20.4	1.1	15.0	.0
Dec	44.3	22.1	33.2	79	1955	24	39.3	1988	-21	1989	22	16.8	1983	986	0	.0	.0	11.7	4.7	27.0	.9
Ann	68.6	43.7	56.1	111+	Jul 1980	14	86.6	Jul 1980	-21	Dec 1989	22	14.2	Jan 1979	4782	1580	14.7	73.7	290.5	19.4	113.0	4.0

\+ 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/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	.71	.63	1.71	1971	3	1.88	1999	.00+	1997
Feb	.85	.64	1.64	1966	9	3.47	1971	.02	1977
Mar	2.13	1.60	2.32	1987	23	9.56	1973	.00	1997
Apr	2.29	2.15	3.14	1985	30	6.26	1985	.13	1989
May	3.92	3.82	2.68	1989	18	9.68	1995	.52	1984
Jun	3.70	3.27	6.40	1981	15	9.14	1992	.50	1980
Jul	3.42	2.75	3.67	1985	29	12.86	1993	.20	1974
Aug	3.11	3.10	5.42	1969	24	7.07	1977	.19	2000
Sep	2.16	1.76	3.55	2001	18	9.80	1973	.18	1979
Oct	2.14	1.86	4.78	1968	17	5.20	1998	.00	1975
Nov	1.16	.95	2.26	1971	17	3.38	1971	.00+	1997
Dec	.86	.65	2.45	1984	16	3.61	1984	.00	1976
Ann	26.45	26.16	6.40	Jun 1981	15	12.86	Jul 1993	.00+	Nov 1997

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	3.6	2.2	.3	@
Feb	3.8	2.0	.5	.1
Mar	6.5	4.2	1.2	.6
Apr	6.5	4.3	1.5	.4
May	9.2	6.0	2.8	1.3
Jun	7.8	5.2	2.5	.9
Jul	7.0	5.3	2.2	1.1
Aug	6.9	4.7	1.9	.7
Sep	6.1	4.1	1.4	.6
Oct	5.4	3.4	1.3	.6
Nov	4.0	2.5	.7	.2
Dec	4.0	2.3	.4	.1
Ann	70.8	46.2	16.7	6.6

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	.12	.26	.37	.48	.60	.73	.89	1.09	1.43	1.74
Feb	.03	.06	.15	.25	.38	.54	.74	1.01	1.39	2.06	2.74
Mar	.09	.26	.57	.89	1.22	1.61	2.06	2.62	3.40	4.69	5.95
Apr	.34	.53	.86	1.18	1.51	1.87	2.29	2.80	3.49	4.61	5.68
May	.91	1.27	1.85	2.36	2.87	3.42	4.03	4.75	5.71	7.23	8.65
Jun	.90	1.24	1.78	2.26	2.74	3.24	3.81	4.48	5.36	6.75	8.05
Jul	.42	.69	1.17	1.65	2.15	2.72	3.37	4.18	5.28	7.09	8.85
Aug	.44	.70	1.14	1.57	2.02	2.52	3.09	3.80	4.74	6.29	7.78
Sep	.23	.39	.69	.99	1.32	1.68	2.11	2.64	3.37	4.57	5.75
Oct	.09	.27	.58	.89	1.23	1.62	2.07	2.63	3.40	4.69	5.95
Nov	.00	.03	.16	.32	.51	.74	1.03	1.40	1.93	2.85	3.78
Dec	.02	.08	.20	.32	.46	.62	.81	1.05	1.38	1.94	2.50
Ann	16.68	18.49	20.85	22.68	24.32	25.92	27.60	29.47	31.76	35.13	38.08

\+ 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)

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	6.2	5.5	1	1	11.0	1971	3	18.5	1979	12	1979	30	6	1993	2.4	1.8	.7	.2	@	8.7	5.4	2.5	.1
Feb	4.9	2.0	1	#	10.5	1978	13	21.8	1971	17	1971	23	6	1993	1.9	1.4	.7	.3	.1	5.2	3.2	2.0	.9
Mar	2.8	2.4	#	#	6.7	1999	13	9.0	1980	8	1971	1	8	1971	1.5	1.1	.3	.1	.0	2.0	1.0	.1	.0
Apr	.6	.0	#	0	6.0	1990	6	6.0	1990	5	1990	6	#+	1997	.3	.2	.1	@	.0	.3	.1	@	.0
May	.0	.0	#	0	.0	0	0	.0	0	#	1977	1	#	1977	.0	.0	.0	.0	.0	.0	.0	.0	.0
Jun	.0	.0	#	0	.0	0	0	.0	0	1	1975	17	#	1975	.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	.4	.0	#	0	6.0	1976	27	8.0	1976	6	1976	28	1	1976	.1	.1	@	@	.0	.2	.1	.1	.0
Nov	1.2	.0	#	0	7.0	1992	25	7.0	1992	7	1992	27	1+	1992	.5	.4	.1	@	.0	.8	.5	.2	.0
Dec	3.9	3.5	1	#	5.4	1997	24	10.6	1997	8	1983	30	3	1983	2.0	1.5	.4	.1	.0	4.3	1.9	.7	.0
Ann	20.0	13.4	N/A	N/A	11.0	Jan 1971	3	21.8	Feb 1971	17	Feb 1971	23	8	Mar 1971	8.7	6.5	2.3	.7	.1	21.5	12.2	5.6	1.0

+ 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	5/10	5/05	5/02	4/30	4/27	4/25	4/22	4/19	4/14
32	4/26	4/21	4/18	4/16	4/13	4/11	4/08	4/05	4/01
28	4/13	4/09	4/06	4/04	4/02	3/30	3/28	3/25	3/21
24	4/09	4/04	4/01	3/29	3/26	3/23	3/20	3/17	3/12
20	4/01	3/25	3/20	3/16	3/12	3/08	3/04	2/27	2/20
16	3/28	3/19	3/13	3/08	3/04	2/27	2/22	2/16	2/08

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	10/04	10/07	10/10	10/13	10/16	10/20	10/26
32	10/03	10/09	10/13	10/16	10/19	10/22	10/26	10/30	11/04
28	10/17	10/22	10/25	10/28	10/30	11/02	11/05	11/08	11/13
24	10/22	10/29	11/03	11/08	11/12	11/17	11/21	11/27	12/04
20	11/02	11/09	11/13	11/17	11/21	11/24	11/28	12/03	12/09
16	11/07	11/15	11/20	11/25	11/29	12/03	12/08	12/13	12/21

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	186	179	174	169	165	161	157	151	144
32	210	202	197	192	188	184	179	174	166
28	228	222	218	215	211	208	204	200	194
24	256	247	241	236	231	226	220	214	205
20	281	271	264	258	253	247	241	234	225
16	303	292	283	276	270	263	256	248	236

***** 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	1079	809	606	296	98	8	0	3	35	215	647	986	4782
60	925	680	461	184	41	1	0	0	9	106	501	831	3739
57	834	602	376	130	21	0	0	0	3	61	418	738	3183
55	775	551	324	99	12	0	0	0	0	41	364	677	2843
50	632	432	211	43	2	0	0	0	0	12	245	533	2110
32	219	133	17	0	0	0	0	0	0	0	24	136	529

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	163	249	434	715	1038	1309	1506	1447	1148	825	368	174	9376
55	7	24	28	124	337	619	793	734	458	152	18	2	3296
57	4	19	18	94	283	559	731	672	400	111	11	0	2902
60	1	13	10	58	210	470	638	579	316	62	4	0	2361
65	0	0	0	21	113	327	483	427	192	17	0	0	1580
70	0	0	0	6	48	200	329	283	101	2	0	0	969

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	39	109	251	499	808	1086	1280	1229	930	601	196	47	39	148	399	898	1706	2792	4072	5301	6231	6832	7028	7075
45	10	52	157	358	653	936	1125	1074	781	451	109	15	10	62	219	577	1230	2166	3291	4365	5146	5597	5706	5721
50	0	20	85	234	499	786	970	919	631	316	50	4	0	20	105	339	838	1624	2594	3513	4144	4460	4510	4514
55	0	5	40	135	349	636	815	764	486	193	17	0	0	5	45	180	529	1165	1980	2744	3230	3423	3440	3440
60	0	0	12	67	215	486	660	609	350	98	3	0	0	0	12	79	294	780	1440	2049	2399	2497	2500	2500
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	45	94	183	315	510	717	843	812	602	383	135	44	45	139	322	637	1147	1864	2707	3519	4121	4504	4639	4683

(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

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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