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: GARDEN CITY EXP STN, KS **COOP ID: 142980**

Climate Division: KS 7 **NWS Call Sign:** **Elevation: 2,868 Feet** **Lat: 38˚00N** **Lon: 100˚49W**

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	42.5	14.7	28.6	78	1986	29	39.0	1986	-22	1984	19	15.3	1979	1129	0	.0	.0	10.6	8.5	31.0	2.9
Feb	48.6	19.3	34.0	86+	1981	21	41.1	1976	-19	1982	5	21.0	1978	869	0	.0	.0	13.9	5.2	26.7	1.8
Mar	57.0	27.8	42.4	91+	1989	11	48.8	1986	-15	1960	3	36.2	1996	700	0	.0	@	21.2	2.4	21.5	.2
Apr	66.8	37.2	52.0	99	1989	23	60.4	1981	9+	1997	13	46.3	1997	396	7	.0	.6	26.5	.2	9.1	.0
May	75.5	48.6	62.1	103	1996	19	65.9	1977	24	1967	1	55.0	1995	151	60	.2	2.4	30.4	.0	.5	.0
Jun	86.7	58.5	72.6	108+	1985	9	76.9	1994	38	1998	6	66.8	1989	21	250	2.1	11.7	30.0	.0	.0	.0
Jul	92.1	63.4	77.8	107	1966	6	83.8	1980	45+	1990	14	74.4	1992	0	395	3.5	19.8	31.0	.0	.0	.0
Aug	89.8	61.9	75.9	108+	1962	11	81.9	1983	44+	1976	28	70.9	1992	5	341	1.8	16.4	31.0	.0	.0	.0
Sep	82.0	52.4	67.2	105	2000	7	73.2	1998	25+	1985	30	60.5	1974	67	133	.5	7.8	29.5	.0	.3	.0
Oct	71.0	39.0	55.0	97	2000	2	59.0	1979	12+	1997	27	48.7	1976	316	5	.0	.9	29.0	.1	6.5	.0
Nov	54.9	26.4	40.7	88	1980	9	48.2	1999	-5	1991	3	33.8	1991	731	0	.0	.0	19.3	1.9	23.5	.1
Dec	45.3	17.8	31.6	77	1996	10	36.5	1999	-17+	1989	23	17.2	1983	1038	0	.0	.0	12.4	6.1	30.3	1.9
Ann	67.7	38.9	53.3	108+	Jun 1985	9	83.8	Jul 1980	-22	Jan 1984	19	15.3	Jan 1979	5423	1191	8.1	59.6	284.8	24.4	149.4	6.9

\+ 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	.43	.30	.93	1990	19	1.52	1990	.00	1986
Feb	.48	.34	1.00	1990	21	2.34	1993	.00+	1977
Mar	1.36	1.03	1.94	1982	19	5.35	1973	.00	1997
Apr	1.65	1.24	2.17	1985	29	6.03	1977	.09	1978
May	3.40	3.03	3.70	1978	1	7.74	1995	1.07	1986
Jun	2.87	2.92	2.80	2001	8	6.70	1989	.12	1976
Jul	2.59	2.53	3.12	1979	23	6.61	1998	.06	1983
Aug	2.56	2.31	3.58	1979	27	6.93	1997	.30	1984
Sep	1.25	.82	2.15	1961	11	3.50	1988	.04	1980
Oct	.92	.62	2.51	1969	5	3.40	1984	.00	1975
Nov	.85	.57	2.06	1971	16	3.16	1972	.00	1989
Dec	.41	.27	.65	1993	13	1.29	1997	.00+	1996
Ann	18.77	19.07	3.70	May 1978	1	7.74	May 1995	.00+	Mar 1997

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	3.6	1.4	.1	.0
Feb	4.0	1.5	.1	@
Mar	5.7	3.4	.8	.2
Apr	6.9	3.7	1.2	.3
May	9.5	6.1	2.1	.8
Jun	8.7	5.4	2.0	.7
Jul	7.6	4.7	1.5	.7
Aug	7.0	4.5	1.7	.7
Sep	5.7	2.9	.8	.2
Oct	4.3	2.0	.6	.1
Nov	3.6	1.8	.6	.1
Dec	3.5	1.4	.2	.0
Ann	70.1	38.8	11.7	3.8

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	.01	.04	.10	.16	.23	.31	.40	.52	.69	.98	1.26
Feb	.00	.01	.06	.13	.20	.30	.42	.58	.80	1.20	1.60
Mar	.04	.13	.32	.51	.73	.98	1.28	1.66	2.19	3.09	3.97
Apr	.20	.33	.56	.79	1.03	1.31	1.62	2.01	2.54	3.41	4.26
May	1.06	1.38	1.86	2.27	2.67	3.08	3.53	4.07	4.75	5.82	6.81
Jun	.25	.44	.82	1.22	1.66	2.16	2.75	3.50	4.53	6.25	7.95
Jul	.36	.57	.94	1.30	1.68	2.10	2.58	3.17	3.96	5.26	6.51
Aug	.45	.67	1.05	1.40	1.75	2.14	2.58	3.12	3.84	4.99	6.09
Sep	.08	.15	.31	.48	.67	.89	1.17	1.51	2.00	2.82	3.63
Oct	.01	.06	.17	.30	.44	.62	.83	1.11	1.50	2.17	2.84
Nov	.01	.04	.12	.23	.36	.52	.73	1.00	1.40	2.09	2.79
Dec	.00	.00	.09	.16	.23	.31	.40	.52	.68	.94	1.19
Ann	12.70	13.86	15.35	16.48	17.50	18.49	19.51	20.65	22.03	24.05	25.81

+ 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)

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median
Jan	4.3	3.3	1	#
Feb	3.1	.8	1	#
Mar	4.6	2.0	#	#
Apr	.9	.0	#	0
May	#	.0	0	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.0	.0	0	0
Oct	.7	.0	#	0
Nov	1.8	.5	#	0
Dec	3.0	3.6	#	#
Ann	18.4	10.2	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	1990	19	14.8	1990	8	1993	22	5	1993
Feb	9.0	1990	21	16.3	1990	9	1995	13	5	1978
Mar	9.0	1999	13	21.0	1987	9	1999	13	1	1999
Apr	3.6	1988	2	7.5	1994	4	1994	5	#+	1997
May	#	1979	4	#	1979	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	.5	1985	29	.5	1985	0	0	0	0	0
Oct	11.0	1997	26	11.0	1997	11	1997	26	1	1997
Nov	12.0	1992	25	12.0	1992	12	1992	25	2	1992
Dec	4.5	1984	14	11.5	1992	8	1992	6	5	1992
Ann	12.0	Nov 1992	25	21.0	Mar 1987	12	Nov 1992	25	5+	Jan 1993

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	2.8	1.6	.5	.2	.0
Feb	2.5	1.2	.4	.1	.0
Mar	1.9	1.5	.6	.2	.0
Apr	.6	.5	.1	.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
Oct	.1	.1	.1	.1	@
Nov	1.0	.7	.2	.1	@
Dec	2.0	1.1	.2	.0	.0
Ann	10.9	6.7	2.1	.7	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	5.9	2.9	1.4	.0
Feb	4.0	1.6	.7	.0
Mar	2.1	.9	.3	.0
Apr	.2	.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	.3	.2	.2	.1
Nov	.8	.6	.5	.2
Dec	2.0	.7	.0	.0
Ann	15.3	7.0	3.1	.3

+ 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	5/19	5/15	5/12	5/10	5/08	5/05	5/03	4/30	4/26
32	5/12	5/07	5/03	4/30	4/27	4/24	4/21	4/18	4/13
28	4/24	4/21	4/18	4/16	4/13	4/11	4/09	4/06	4/03
24	4/18	4/14	4/10	4/08	4/05	4/03	3/31	3/28	3/23
20	4/12	4/06	4/01	3/28	3/25	3/21	3/17	3/12	3/06
16	4/07	3/31	3/26	3/21	3/17	3/13	3/09	3/04	2/25

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	9/16	9/21	9/24	9/27	9/30	10/02	10/05	10/08	10/13
32	9/28	10/03	10/06	10/09	10/11	10/14	10/16	10/20	10/24
28	10/02	10/07	10/12	10/15	10/19	10/22	10/26	10/30	11/05
24	10/19	10/23	10/27	10/30	11/02	11/04	11/07	11/11	11/16
20	10/28	11/02	11/06	11/09	11/12	11/14	11/17	11/21	11/26
16	11/03	11/09	11/13	11/16	11/20	11/23	11/27	12/01	12/06

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	161	156	151	148	144	141	137	133	127
32	185	179	174	170	166	163	159	154	147
28	208	201	196	191	187	183	179	174	167
24	232	224	219	214	210	205	201	195	188
20	256	248	241	236	231	226	221	215	206
16	275	265	258	252	247	241	235	228	219

***** 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	1129	869	700	396	151	21	0	5	67	316	731	1038	5423
60	974	729	545	264	71	5	0	0	22	182	581	883	4256
57	881	647	454	196	40	2	0	0	9	117	493	790	3629
55	819	596	397	157	25	0	0	0	4	83	436	728	3245
50	669	466	260	79	6	0	0	0	0	29	302	577	2388
32	221	125	16	0	0	0	0	0	0	0	32	150	544

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	115	181	339	600	931	1219	1418	1360	1056	712	291	135	8357
55	0	7	7	67	243	529	705	647	371	82	6	0	2664
57	0	3	2	47	196	470	643	585	315	54	2	0	2317
60	0	0	0	25	134	384	550	492	238	26	0	0	1849
65	0	0	0	7	60	250	395	341	133	5	0	0	1191
70	0	0	0	0	20	141	243	204	62	0	0	0	670

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	22	64	181	381	685	982	1166	1106	815	474	133	32	22	86	267	648	1333	2315	3481	4587	5402	5876	6009	6041
45	0	25	101	255	532	832	1011	951	666	334	68	7	0	25	126	381	913	1745	2756	3707	4373	4707	4775	4782
50	0	8	46	157	387	682	856	796	521	211	26	0	0	8	54	211	598	1280	2136	2932	3453	3664	3690	3690
55	0	1	13	83	253	533	701	641	380	114	5	0	0	1	14	97	350	883	1584	2225	2605	2719	2724	2724
60	0	0	2	33	140	388	546	486	257	52	0	0	0	0	2	35	175	563	1109	1595	1852	1904	1904	1904
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	47	88	164	268	427	625	759	724	517	335	131	56	47	135	299	567	994	1619	2378	3102	3619	3954	4085	4141

(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