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: COLBY 1 SW, KS **COOP ID: 141699**

Climate Division: KS 1 **NWS Call Sign:** **Elevation: 3,170 Feet** **Lat: 39˚24N** **Lon: 101˚04W**

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	39.2	12.3	25.8	76	1990	11	36.4	1986	-24	1959	4	13.9	1979	1217	0	.0	.0	8.6	9.8	31.0	4.5
Feb	44.9	16.5	30.7	81	1970	18	39.0	1999	-22+	1982	6	16.1	1978	961	0	.0	.0	12.0	6.6	27.4	2.8
Mar	53.0	24.1	38.6	89	1963	29	44.9	1986	-22	1960	3	32.3	1975	821	0	.0	.0	18.3	3.2	25.5	.6
Apr	63.0	33.4	48.2	98	1989	23	54.2	1981	5	1989	10	42.2	1983	505	1	.0	.3	24.7	.4	13.2	.0
May	72.1	44.7	58.4	102+	2000	30	63.4	1994	20	1967	2	51.9	1995	240	34	.1	1.0	30.3	.0	1.5	.0
Jun	84.3	54.9	69.6	110	1971	25	76.0	1988	33+	1998	6	62.8	1982	46	183	1.4	9.7	29.9	.0	.0	.0
Jul	90.0	60.6	75.3	109+	1990	2	79.9	1980	42	1990	13	71.0	1992	1	320	3.2	17.3	31.0	.0	.0	.0
Aug	87.8	58.6	73.2	106+	1995	9	79.2	1983	40	1964	28	67.8	1992	13	268	1.5	14.7	31.0	.0	.0	.0
Sep	79.4	48.8	64.1	104	1985	1	70.2	1998	21	1985	30	58.7	1974	111	84	.3	6.5	29.4	.0	1.1	.0
Oct	67.5	35.4	51.5	97	2000	1	54.2	1979	7	1993	30	45.9	1976	421	1	.0	.7	28.1	.2	10.4	.0
Nov	50.8	23.6	37.2	84+	1998	23	45.9	1999	-8	1976	28	29.1	1985	834	0	.0	.0	16.3	3.2	25.7	.2
Dec	41.9	15.1	28.5	83	1964	24	34.0	1980	-32	1989	22	12.2	1983	1132	0	.0	.0	9.3	7.4	30.7	2.6
Ann	64.5	35.7	50.1	110	Jun 1971	25	79.9	Jul 1980	-32	Dec 1989	22	12.2	Dec 1983	6302	891	6.5	50.2	268.9	30.8	166.5	10.7

\+ 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: 1950-2001

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

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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	.40	.22	1.46	1960	14	1.54	1992	.00	1986
Feb	.46	.28	.86	1950	11	2.12	1993	.02+	1977
Mar	1.20	.78	1.45	1984	19	3.49	1973	.00	1997
Apr	1.93	1.52	2.08	1981	19	7.16	1994	.06	1992
May	3.60	3.80	3.25	1977	21	8.92	1981	.18	2000
Jun	2.96	2.54	4.86	1975	18	8.95	1975	.15	1981
Jul	3.95	3.16	3.62	1975	31	9.39	1993	.63	1984
Aug	2.47	1.87	3.10	1982	31	10.42	1993	.21	1976
Sep	1.39	.95	2.61	1957	14	5.69	1973	.05	1979
Oct	1.24	.74	3.16	1997	26	5.35	1997	.00	1987
Nov	.81	.74	1.60	1975	19	2.07	1975	.00	1989
Dec	.36	.31	.60	1982	25	1.37	1982	.00	2000
Ann	20.77	19.82	4.86	Jun 1975	18	10.42	Aug 1993	.00+	Dec 2000

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	3.7	1.2	.1	.0
Feb	3.6	1.4	.2	.0
Mar	6.2	3.1	.7	.2
Apr	6.5	3.9	1.3	.4
May	10.5	6.7	2.5	.9
Jun	8.5	5.3	1.7	.6
Jul	9.0	6.0	2.5	1.2
Aug	7.1	4.0	1.6	.6
Sep	5.6	2.9	1.0	.2
Oct	4.4	2.4	.8	.3
Nov	4.0	2.1	.5	.1
Dec	3.2	1.1	@	.0
Ann	72.3	40.1	12.9	4.5

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	.09	.15	.21	.29	.37	.48	.64	.89	1.15
Feb	.01	.03	.08	.14	.21	.29	.40	.54	.75	1.11	1.48
Mar	.05	.14	.31	.49	.68	.90	1.15	1.48	1.92	2.66	3.39
Apr	.31	.48	.76	1.03	1.30	1.60	1.94	2.36	2.91	3.81	4.67
May	.71	1.03	1.56	2.04	2.54	3.06	3.66	4.38	5.33	6.86	8.32
Jun	.44	.69	1.12	1.53	1.95	2.42	2.95	3.61	4.49	5.93	7.31
Jul	1.00	1.37	1.95	2.46	2.96	3.49	4.08	4.78	5.69	7.14	8.49
Aug	.31	.51	.85	1.20	1.56	1.97	2.43	3.01	3.80	5.09	6.34
Sep	.11	.20	.38	.57	.79	1.03	1.32	1.69	2.20	3.06	3.90
Oct	.01	.05	.17	.32	.51	.75	1.05	1.46	2.04	3.07	4.12
Nov	.03	.10	.21	.33	.46	.60	.78	.99	1.29	1.79	2.28
Dec	.01	.02	.06	.11	.17	.24	.32	.43	.59	.86	1.13
Ann	14.04	15.31	16.96	18.22	19.35	20.44	21.57	22.83	24.37	26.60	28.55

\+ 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: 1950-2001
(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	4.8	3.5	1	1
Feb	4.5	4.2	1	#
Mar	6.7	5.8	1	#
Apr	3.4	2.5	#	#
May	.1	.0	0	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.3	.0	#	0
Oct	1.4	.0	#	0
Nov	4.0	3.3	#	#
Dec	3.9	3.2	1	#
Ann	29.1	22.5	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	8.1	1993	9	11.0	1988	12	1983	4	6	1993
Feb	10.0	1997	24	16.1	1993	10+	1997	24	5	1993
Mar	13.0	1984	19	19.1	1984	14	1999	13	2	1999
Apr	11.0	1994	12	17.7	1994	10	1994	12	1	1994
May	4.0	1990	4	4.0	1990	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	4.5	1995	21	4.5	1995	5	1995	21	#+	1995
Oct	19.0	1997	26	20.0	1997	20	1997	26	3	1997
Nov	8.0	1983	27	12.9	1983	11	1983	30	2+	2000
Dec	10.0	1982	25	17.5	1982	17	1982	28	5	1983
Ann	19.0	Oct 1997	26	20.0	Oct 1997	20	Oct 1997	26	6	Jan 1993

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	3.4	1.5	.5	.2	.0
Feb	2.6	1.4	.5	.2	@
Mar	3.1	2.0	.7	.3	.1
Apr	1.6	1.0	.5	.2	@
May	.1	@	@	.0	.0
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.1	.1	@	.0	.0
Oct	.5	.3	.2	.1	@
Nov	2.5	1.3	.5	.2	.0
Dec	2.9	1.2	.5	.1	@
Ann	16.8	8.8	3.4	1.3	.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	8.8	3.5	1.6	.2
Feb	5.9	3.1	1.3	.1
Mar	4.2	2.0	.9	.2
Apr	1.4	.7	.3	@
May	.0	.0	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.1	@	@	.0
Oct	.5	.3	.2	.1
Nov	4.1	2.1	1.0	.1
Dec	6.0	2.6	1.0	.2
Ann	31.0	14.3	6.3	.9

+ 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	5/29	5/24	5/20	5/17	5/15	5/12	5/09	5/06	5/01
32	5/16	5/12	5/10	5/07	5/05	5/03	5/01	4/28	4/24
28	5/12	5/06	5/03	4/29	4/26	4/23	4/20	4/16	4/10
24	4/28	4/23	4/19	4/16	4/13	4/10	4/06	4/03	3/28
20	4/16	4/11	4/08	4/05	4/02	3/31	3/28	3/24	3/20
16	4/11	4/05	3/31	3/27	3/24	3/20	3/16	3/12	3/05

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	9/13	9/17	9/20	9/23	9/25	9/27	9/30	10/03	10/07
32	9/18	9/23	9/27	9/30	10/04	10/07	10/10	10/14	10/19
28	9/30	10/05	10/09	10/12	10/15	10/17	10/20	10/24	10/29
24	10/05	10/11	10/15	10/18	10/22	10/25	10/28	11/01	11/07
20	10/16	10/22	10/26	10/30	11/03	11/06	11/10	11/15	11/21
16	10/29	11/03	11/07	11/10	11/13	11/16	11/19	11/23	11/28

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	151	145	140	136	133	129	125	120	114
32	168	162	158	154	151	147	143	139	133
28	192	185	179	175	171	167	162	157	150
24	214	206	200	196	191	186	182	176	168
20	237	229	223	218	214	209	204	198	190
16	260	251	244	238	233	228	222	216	207

***** 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	1217	961	821	505	240	46	1	13	111	421	834	1132	6302
60	1062	821	666	360	135	15	0	3	45	271	684	977	5039
57	969	737	573	279	88	7	0	1	21	190	594	884	4343
55	907	687	511	230	63	4	0	0	12	143	536	822	3915
50	754	556	365	126	22	0	0	0	1	57	398	671	2950
32	279	186	39	0	0	0	0	0	0	0	68	220	792

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	85	149	241	486	818	1127	1342	1278	963	603	224	111	7427
55	0	6	0	26	168	440	629	565	285	33	2	0	2154
57	0	0	0	15	130	383	567	503	234	18	0	0	1850
60	0	0	0	6	85	301	474	412	167	6	0	0	1451
65	0	0	0	1	34	183	320	268	84	1	0	0	891
70	0	0	0	0	10	93	176	147	34	0	0	0	460

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	15	45	123	300	596	908	1113	1041	735	386	94	22	15	60	183	483	1079	1987	3100	4141	4876	5262	5356	5378
45	0	14	63	191	444	758	958	886	591	258	46	2	0	14	77	268	712	1470	2428	3314	3905	4163	4209	4211
50	0	2	22	108	302	610	803	731	447	152	12	0	0	2	24	132	434	1044	1847	2578	3025	3177	3189	3189
55	0	0	3	51	185	461	648	576	316	70	0	0	0	0	3	54	239	700	1348	1924	2240	2310	2310	2310
60	0	0	0	20	93	321	494	426	197	25	0	0	0	0	0	20	113	434	928	1354	1551	1576	1576	1576
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	31	70	129	224	367	572	716	671	467	288	98	41	31	101	230	454	821	1393	2109	2780	3247	3535	3633	3674

(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