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: CARPENTER, WY **COOP ID: 481547**

Climate Division: WY 8 **NWS Call Sign:** **Elevation: 5,390 Feet** **Lat: 41˚03N** **Lon: 104˚22W**

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	38.7	13.3	26.0	70	1982	26	32.2+	1990	-29	1984	18	14.4	1979	1208	0	.0	.0	7.3	7.6	29.9	5.1
Feb	43.2	17.2	30.2	76	1962	11	37.4	1991	-28	1982	5	20.0	1989	975	0	.0	.0	10.3	5.0	27.2	2.6
Mar	49.7	22.7	36.2	78+	1997	20	43.0	1986	-16+	1960	3	31.6	1975	893	0	.0	.0	17.8	2.6	27.7	.7
Apr	58.6	29.8	44.2	88	1992	30	49.6	1992	-9	1975	2	36.7	1983	625	0	.0	.0	23.9	.6	19.3	.1
May	68.4	39.3	53.9	94	1954	20	59.0	1994	18	1978	7	48.5	1995	353	7	.0	.3	29.6	.0	4.9	.0
Jun	79.1	48.2	63.7	103	1954	23	69.4	1988	28+	1969	2	58.1	1982	109	68	.1	4.3	29.9	.0	.1	.0
Jul	85.6	54.0	69.8	104	1964	19	73.2	2000	34	1952	8	66.0	1992	14	162	.6	11.8	31.0	.0	.0	.0
Aug	83.9	52.5	68.2	103	1979	4	72.6	1995	35	1956	31	64.8	1974	32	132	.1	8.1	31.0	.0	.0	.0
Sep	75.4	43.7	59.6	98	1977	6	65.7	1998	15+	1985	30	54.4	1985	193	29	.0	2.4	29.2	.0	2.6	.0
Oct	63.5	32.7	48.1	88+	1967	3	51.3	1988	-6	1991	31	43.3	1984	524	0	.0	.0	27.5	.4	14.6	.1
Nov	47.5	21.2	34.4	76+	1999	15	44.4	1999	-14+	1993	25	23.9	1985	919	0	.0	.0	14.3	3.9	27.1	1.1
Dec	40.3	14.4	27.4	70	1980	17	35.8	1980	-31	1990	22	12.3	1983	1167	0	.0	.0	8.5	6.6	29.5	4.1
Ann	61.2	32.4	46.8	104	Jul 1964	19	73.2	Jul 2000	-31	Dec 1990	22	12.3	Dec 1983	7012	398	.8	26.9	260.3	26.7	182.9	13.8

\+ 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	.31	.25	1.00	1949	4	1.33	1980	.00	1983
Feb	.22	.19	.44	1980	7	.68+	1993	.00+	1992
Mar	.90	.69	1.20+	1990	6	2.83	1990	.05	1985
Apr	1.28	1.06	1.45	1999	30	3.94	1999	.18	1992
May	2.38	2.29	1.78	1975	28	5.37	1981	.19	1974
Jun	2.37	1.93	2.51	1974	8	5.91	1995	.62	2000
Jul	2.49	1.89	5.50	1985	19	7.61	1985	.44	1988
Aug	1.54	1.30	2.02	1955	5	4.92	1999	.17	1985
Sep	1.44	1.35	2.52	1966	2	3.50	1973	.09	1978
Oct	.69	.46	1.50	1951	5	2.20	1993	.06	1977
Nov	.47	.42	.80	1993	12	1.31	1979	.00+	1981
Dec	.32	.29	.74	1985	9	1.03	1985	.00+	1996
Ann	14.41	14.13	5.50	Jul 1985	19	7.61	Jul 1985	.00+	Dec 1996

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	3.5	1.0	@	.0
Feb	3.4	.9	.0	.0
Mar	5.3	2.4	.4	.1
Apr	7.0	3.8	.5	.1
May	10.7	6.0	1.3	.3
Jun	9.5	5.7	1.4	.3
Jul	8.9	5.1	1.4	.4
Aug	7.9	3.9	.7	.1
Sep	6.9	3.7	.8	.1
Oct	4.4	2.1	.3	@
Nov	3.5	1.6	.1	.0
Dec	2.8	1.2	.1	.0
Ann	73.8	37.4	7.0	1.4

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	.03	.07	.12	.17	.21	.26	.32	.38	.47	.61	.74
Feb	.00	.00	.02	.06	.10	.15	.21	.28	.38	.55	.72
Mar	.11	.17	.30	.43	.56	.71	.88	1.09	1.39	1.86	2.33
Apr	.26	.38	.56	.74	.91	1.09	1.30	1.56	1.89	2.42	2.93
May	.61	.84	1.18	1.49	1.79	2.11	2.46	2.88	3.43	4.29	5.10
Jun	.55	.77	1.12	1.43	1.74	2.07	2.44	2.87	3.45	4.36	5.22
Jul	.48	.70	1.07	1.40	1.74	2.11	2.53	3.03	3.69	4.76	5.77
Aug	.23	.36	.58	.79	1.02	1.26	1.54	1.88	2.34	3.10	3.82
Sep	.25	.37	.58	.78	.98	1.20	1.45	1.75	2.16	2.81	3.44
Oct	.09	.15	.25	.34	.44	.55	.68	.84	1.05	1.40	1.73
Nov	.00	.04	.12	.19	.27	.36	.46	.58	.75	1.03	1.30
Dec	.00	.00	.05	.13	.19	.26	.33	.42	.53	.71	.90
Ann	9.35	10.29	11.52	12.46	13.31	14.14	15.00	15.96	17.13	18.85	20.35

\+ 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	5.4	4.5	1	1
Feb	2.8	1.3	1	#
Mar	7.7	5.1	1	#
Apr	4.2	3.8	#	#
May	.6	.0	#	0
Jun	#	.0	#	0
Jul	.0	.0	#	0
Aug	.0	.0	#	0
Sep	.7	.0	#	0
Oct	2.1	.9	#	#
Nov	4.7	2.8	1	#
Dec	4.5	4.6	1	#
Ann	32.7	23.0	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	12.0	1980	25	24.7	1980	17	1980	28	6	1980
Feb	6.0	1980	7	11.2	1990	10	1980	7	6	1980
Mar	11.0	1988	2	23.4	1990	11	1988	2	11	1988
Apr	7.5	1984	2	9.0+	1999	10	1984	3	1	1989
May	4.5	1978	6	6.0	1979	4	1978	6	#+	2000
Jun	#	1998	5	#	1998	#	1978	7	#	1978
Jul	.0	0	0	.0	0	#	1996	31	#	1996
Aug	.0	0	0	.0	0	#	1978	8	#	1978
Sep	3.5	1985	28	3.5+	1995	4	1985	28	#+	2000
Oct	6.0	1997	25	11.5	1997	8	1997	25	1	1997
Nov	8.0	1973	3	15.5	1973	19	1983	29	7	1983
Dec	19.0	1985	9	19.0	1985	23	1985	13	8	1985
Ann	19.0	Dec 1985	9	24.7	Jan 1980	23	Dec 1985	13	11	Mar 1988

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	3.1	1.9	.5	.2	@
Feb	2.8	1.7	.2	@	.0
Mar	3.7	2.4	1.0	.4	@
Apr	2.0	1.7	.5	.2	.0
May	.3	.2	.1	.0	.0
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.3	.2	.1	.0	.0
Oct	1.2	.7	.3	.1	.0
Nov	2.6	1.9	.5	.2	.0
Dec	2.8	1.7	.5	.2	@
Ann	18.8	12.4	3.7	1.3	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	6.1	3.4	1.1	.3
Feb	4.9	2.3	1.0	.1
Mar	3.9	1.6	.7	@
Apr	1.1	.4	.2	@
May	.1	@	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.1	@	.0	.0
Oct	.7	.3	.1	.0
Nov	3.3	1.5	.9	.0
Dec	5.6	2.2	.8	.0
Ann	25.8	11.7	4.8	.4

+ 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	6/16	6/11	6/07	6/03	5/31	5/28	5/24	5/20	5/15
32	6/03	5/28	5/24	5/21	5/18	5/14	5/11	5/07	5/02
28	5/18	5/14	5/11	5/09	5/07	5/05	5/03	4/30	4/27
24	5/10	5/06	5/02	4/29	4/27	4/24	4/21	4/17	4/13
20	5/04	4/28	4/24	4/21	4/18	4/14	4/11	4/07	4/01
16	4/20	4/14	4/10	4/06	4/03	3/31	3/27	3/23	3/18

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	9/05	9/09	9/12	9/15	9/17	9/20	9/22	9/25	9/29
32	9/13	9/17	9/20	9/22	9/24	9/26	9/29	10/02	10/06
28	9/19	9/23	9/26	9/28	10/01	10/03	10/05	10/08	10/12
24	9/25	10/01	10/04	10/08	10/11	10/14	10/17	10/21	10/26
20	10/03	10/09	10/13	10/16	10/19	10/23	10/26	10/30	11/05
16	10/07	10/14	10/18	10/22	10/26	10/29	11/02	11/07	11/13

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	131	123	118	113	108	104	99	94	86
32	151	143	138	133	129	125	120	115	107
28	165	158	153	149	146	142	138	133	127
24	187	180	175	170	166	162	158	153	145
20	208	200	194	189	184	179	174	168	160
16	231	222	216	210	205	200	194	188	179

***** 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	1208	975	893	625	353	109	14	32	193	524	919	1167	7012
60	1053	835	738	477	221	43	1	6	95	371	769	1012	5621
57	960	751	645	392	156	21	0	2	54	282	679	919	4861
55	898	695	583	337	119	12	0	1	34	226	619	857	4381
50	743	555	430	214	52	2	0	0	8	113	480	705	3302
32	257	151	52	8	0	0	0	0	0	1	108	239	816

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	72	100	183	373	677	949	1171	1123	827	500	179	95	6249
55	0	0	0	12	83	271	458	411	171	12	0	0	1418
57	0	0	0	7	58	220	396	350	131	5	0	0	1167
60	0	0	0	2	30	152	304	261	82	1	0	0	832
65	0	0	0	0	7	68	162	132	29	0	0	0	398
70	0	0	0	0	1	20	61	45	7	0	0	0	134

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	11	28	74	200	451	733	950	901	609	300	68	21	11	39	113	313	764	1497	2447	3348	3957	4257	4325	4346
45	1	3	27	104	308	583	795	746	463	179	25	6	1	4	31	135	443	1026	1821	2567	3030	3209	3234	3240
50	0	0	4	46	183	434	640	591	324	89	3	0	0	0	4	50	233	667	1307	1898	2222	2311	2314	2314
55	0	0	0	15	87	294	485	436	204	31	0	0	0	0	0	15	102	396	881	1317	1521	1552	1552	1552
60	0	0	0	0	26	168	334	286	100	5	0	0	0	0	0	0	26	194	528	814	914	919	919	919
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	24	42	91	175	311	465	596	572	405	240	76	34	24	66	157	332	643	1108	1704	2276	2681	2921	2997	3031

(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