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: CARLYLE 12 NW, MT **COOP ID: 241518**

Climate Division: MT 7 **NWS Call Sign:** **Elevation: 3,029 Feet** **Lat: 46˚45N** **Lon: 104˚17W**

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	26.2	5.7	16.0	62+	1995	10	30.3	1992	-38	1982	10	.4	1979	1521	0	.0	.0	.9	18.2	30.1	11.1
Feb	33.6	12.2	22.9	69	1992	27	33.5	1984	-35	1989	2	6.9	1989	1178	0	.0	.0	3.3	11.3	26.7	6.5
Mar	43.4	20.3	31.9	77+	1999	26	41.2	1986	-23	1996	8	20.2	1996	1027	0	.0	.0	10.6	6.8	27.4	2.5
Apr	56.3	30.0	43.2	91	1980	21	50.8	1987	-8	1997	8	36.3	1975	655	0	.0	@	20.9	1.1	18.4	.2
May	67.4	40.6	54.0	99	1980	22	60.4	1977	13	1967	5	48.3	1996	356	14	.0	.3	29.2	.0	4.7	.0
Jun	76.7	49.7	63.2	107	1988	20	76.4	1988	30	1998	3	57.2	1998	142	89	.3	2.5	30.0	.0	.2	.0
Jul	84.2	54.8	69.5	106	1988	27	74.3	1988	34	1971	26	61.1	1993	50	190	1.0	7.6	31.0	.0	.0	.0
Aug	83.8	53.5	68.7	104+	2001	7	75.8	1983	31	1992	25	62.7	1977	71	184	.4	8.8	31.0	.0	@	.0
Sep	71.6	43.5	57.6	103+	1978	5	65.5	1998	15	1995	21	52.0	1984	265	41	.2	2.2	28.6	.0	2.7	.0
Oct	58.6	33.1	45.9	92+	1997	2	49.4	1979	-8	1991	30	41.9	1972	594	0	.0	.1	23.6	.6	13.3	.1
Nov	40.3	20.0	30.2	78	1999	7	42.1	1999	-23	1985	27	15.0	1985	1047	0	.0	.0	8.0	8.4	26.2	2.5
Dec	29.7	9.7	19.7	62	1998	1	29.4	1999	-39	1989	21	1.8	1983	1406	0	.0	.0	1.9	15.6	29.8	8.0
Ann	56.0	31.1	43.6	107	Jun 1988	20	76.4	Jun 1988	-39	Dec 1989	21	.4	Jan 1979	8312	518	1.9	21.5	219.0	62.0	179.5	30.9

\+ 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: 1962-2001

(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	.48	.46	.50	1995	16	.98	1971	.04	1973
Feb	.45	.36	.51	1967	21	1.09	1979	.07	1992
Mar	.75	.64	1.00	1989	27	1.85	1982	.10	1986
Apr	1.52	1.35	1.85	1992	18	4.17	1989	.06	1988
May	2.27	1.87	1.82	1970	8	5.77	1978	.32	1984
Jun	2.63	2.60	2.36	1973	18	5.84	1973	.37	1988
Jul	1.91	1.47	2.82	1962	13	8.34	1993	.56	1988
Aug	1.45	1.13	3.12	1964	29	3.83	1980	.11	2000
Sep	1.47	1.00	2.00	1967	13	4.33	1973	.15	1989
Oct	1.29	.81	2.02	1971	2	4.56	1982	.17	1983
Nov	.67	.53	1.75	2000	1	2.96	2000	.05	1987
Dec	.53	.47	.63	2000	28	1.37	1977	.05	1994
Ann	15.42	15.48	3.12	Aug 1964	29	8.34	Jul 1993	.04	Jan 1973

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	6.5	1.7	@	.0
Feb	6.2	1.7	.0	.0
Mar	7.4	2.9	.1	@
Apr	8.4	4.0	.8	.1
May	10.6	5.6	1.2	.5
Jun	10.0	5.8	1.7	.5
Jul	7.6	4.5	1.1	.2
Aug	5.9	3.2	.8	.2
Sep	6.2	3.7	.7	.3
Oct	6.0	3.1	.8	.2
Nov	6.9	2.4	.1	@
Dec	7.0	1.9	@	.0
Ann	88.7	40.5	7.3	2.0

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	.10	.14	.21	.28	.34	.41	.49	.59	.72	.92	1.11
Feb	.10	.14	.21	.27	.33	.39	.47	.55	.66	.84	1.01
Mar	.18	.25	.36	.46	.55	.66	.77	.91	1.09	1.38	1.64
Apr	.20	.32	.53	.75	.97	1.21	1.50	1.86	2.33	3.12	3.88
May	.45	.66	.99	1.30	1.61	1.93	2.31	2.76	3.35	4.30	5.20
Jun	.64	.89	1.27	1.61	1.95	2.31	2.71	3.18	3.80	4.79	5.71
Jul	.35	.52	.80	1.06	1.32	1.61	1.93	2.32	2.84	3.68	4.48
Aug	.27	.39	.61	.80	1.00	1.22	1.47	1.76	2.16	2.79	3.40
Sep	.17	.28	.49	.70	.91	1.16	1.44	1.79	2.27	3.06	3.83
Oct	.12	.21	.39	.56	.76	.98	1.24	1.57	2.02	2.77	3.51
Nov	.10	.15	.25	.34	.44	.54	.66	.82	1.02	1.35	1.67
Dec	.10	.14	.22	.29	.37	.45	.54	.65	.80	1.03	1.26
Ann	9.80	10.84	12.20	13.24	14.18	15.10	16.06	17.13	18.44	20.36	22.05

\+ 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: 1962-2001
(3) Derived from 1971-2000 serially complete daily data

Complete documentation available from:
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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	7.8	8.0	1	#
Feb	7.9	5.5	#	#
Mar	8.0	7.0	#	0
Apr	5.2	4.0	#	0
May	1.6	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.4	.0	#	0
Oct	2.2	1.0	#	0
Nov	6.3	4.0	#	#
Dec	7.9	6.5	#	#
Ann	47.3	36.0	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	8.0	1971	23	23.0	1977	3	1974	1	3	1974
Feb	6.0	1973	12	29.0	1979	#+	1999	11	#+	1999
Mar	8.0	1987	21	25.0	1996	#+	2000	31	#+	2000
Apr	12.0	1991	28	23.0	1991	#+	2000	13	#+	2000
May	12.0	1983	12	14.0	1983	#+	1998	7	#+	1998
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	3.0	1983	19	5.0	1984	#	1995	20	#	1995
Oct	6.0	1996	21	9.0	1996	2	1971	30	#+	2000
Nov	6.0	1996	23	21.5	2000	2	1971	16	#+	1999
Dec	6.0	1975	31	19.0	1978	4	1971	7	1	1971
Ann	12.0+	Apr 1991	28	29.0	Feb 1979	4	Dec 1971	7	3	Jan 1974

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	5.8	5.0	.7	.2	.0
Feb	5.3	4.3	.7	.2	.0
Mar	4.9	3.8	.8	.1	.0
Apr	2.6	2.0	.6	.2	@
May	.5	.4	.2	.1	@
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.2	.2	.1	.0	.0
Oct	1.4	1.0	.1	@	.0
Nov	4.2	3.4	.5	.1	.0
Dec	5.9	4.5	.5	@	.0
Ann	30.8	24.6	4.2	.9	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	-9.9	-9.9	-9.9	-9.9
Feb	-9.9	-9.9	-9.9	-9.9
Mar	-9.9	-9.9	-9.9	-9.9
Apr	-9.9	-9.9	-9.9	-9.9
May	.0	.0	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	-9.9	-9.9	-9.9	-9.9
Oct	-9.9	-9.9	-9.9	-9.9
Nov	-9.9	-9.9	-9.9	-9.9
Dec	-9.9	-9.9	-9.9	-9.9
Ann	-9.9	-9.9	-9.9	-9.9

+ 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	6/23	6/15	6/09	6/04	5/31	5/26	5/21	5/15	5/07
32	6/03	5/28	5/24	5/20	5/17	5/13	5/10	5/05	4/30
28	5/19	5/14	5/11	5/07	5/05	5/02	4/29	4/25	4/20
24	5/10	5/05	5/01	4/28	4/26	4/23	4/20	4/16	4/12
20	4/30	4/25	4/21	4/17	4/14	4/11	4/08	4/04	3/29
16	4/18	4/13	4/10	4/07	4/04	4/01	3/29	3/26	3/21

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	8/31	9/05	9/08	9/11	9/13	9/15	9/18	9/21	9/26
32	9/07	9/11	9/15	9/18	9/20	9/23	9/26	9/29	10/04
28	9/13	9/19	9/23	9/26	9/29	10/02	10/06	10/09	10/15
24	9/19	9/26	10/01	10/05	10/09	10/13	10/17	10/22	10/28
20	9/28	10/04	10/09	10/13	10/17	10/20	10/24	10/29	11/04
16	10/07	10/13	10/18	10/22	10/26	10/30	11/03	11/07	11/14

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	133	123	116	110	105	99	93	86	77
32	150	142	136	130	126	121	116	110	102
28	168	161	155	151	147	143	138	133	126
24	188	180	175	170	165	161	156	150	142
20	207	200	194	189	185	180	175	170	162
16	230	221	215	209	204	199	194	187	178

***** 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	1521	1178	1027	655	356	142	50	71	265	594	1047	1406	8312
60	1366	1038	872	508	230	70	16	28	162	440	897	1251	6878
57	1273	962	779	423	168	41	8	15	112	349	807	1158	6095
55	1213	911	718	369	132	27	3	9	84	290	751	1096	5603
50	1068	779	574	245	63	8	0	2	34	161	611	946	4491
32	576	374	165	17	0	0	0	0	0	4	211	458	1805

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	79	119	161	352	681	937	1163	1136	767	433	155	76	6059
55	3	12	1	13	100	274	453	432	161	6	5	0	1460
57	0	7	0	8	74	227	396	377	129	3	0	0	1221
60	0	0	0	3	43	167	311	296	88	1	0	0	909
65	0	0	0	0	14	89	190	184	41	0	0	0	518
70	0	0	0	0	3	36	102	100	16	0	0	0	257

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	1	10	45	180	445	699	915	906	550	246	44	4	1	11	56	236	681	1380	2295	3201	3751	3997	4041	4045
45	0	1	15	95	302	549	760	751	404	143	15	0	0	1	16	111	413	962	1722	2473	2877	3020	3035	3035
50	0	0	2	49	181	400	605	596	278	72	4	0	0	0	2	51	232	632	1237	1833	2111	2183	2187	2187
55	0	0	0	17	94	264	451	442	169	26	0	0	0	0	0	17	111	375	826	1268	1437	1463	1463	1463
60	0	0	0	4	40	145	307	293	89	7	0	0	0	0	0	4	44	189	496	789	878	885	885	885
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	9	43	138	279	429	585	568	344	171	33	2	0	9	52	190	469	898	1483	2051	2395	2566	2599	2601

(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