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: CASCADE 20 SSE, MT **COOP ID: 241557**

Climate Division: MT 4 **NWS Call Sign:** **Elevation: 4,600 Feet** **Lat: 47˚00N** **Lon: 111˚35W**

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	35.8	12.2	24.0	64	1996	12	36.1	1986	-43	1957	25	8.9	1979	1271	0	.0	.0	4.1	9.7	27.4	8.5
Feb	40.2	15.8	28.0	65+	1995	24	38.2	1991	-44	1989	4	11.2	1989	1035	0	.0	.0	7.0	6.0	24.5	4.9
Mar	46.2	20.7	33.5	74	1978	30	41.1	1986	-30	1960	2	24.5	1996	979	0	.0	.0	12.4	3.1	27.1	2.1
Apr	54.9	27.2	41.1	82+	1987	28	48.0	1987	-10	1975	6	30.0	1975	718	0	.0	.0	20.2	.8	21.6	.2
May	63.6	34.6	49.1	86+	2001	12	53.2	1987	12+	1967	4	44.3	1996	494	0	.0	.0	28.1	.0	11.2	.0
Jun	71.9	41.0	56.5	95	1990	30	65.4	1988	20	1969	13	52.9	1998	267	10	.0	.6	29.9	.0	2.9	.0
Jul	79.8	43.5	61.7	99+	1956	28	67.4	1985	25	1963	1	55.2	1993	144	41	.0	3.3	31.0	.0	1.3	.0
Aug	80.1	43.1	61.6	100	1961	5	67.3	1971	21	1992	25	56.6	1980	159	53	.0	3.8	30.9	.0	1.3	.0
Sep	69.7	35.7	52.7	96	1981	18	59.0	1998	6	1985	29	45.7	1985	378	9	.0	.6	28.0	@	10.4	.0
Oct	58.6	29.5	44.1	88	1992	1	48.1	1988	-16	1991	30	37.6	1984	651	0	.0	.0	24.4	.6	19.4	.4
Nov	43.1	21.2	32.2	73	1990	12	43.5	1999	-36	1959	16	13.2	1985	985	0	.0	.0	9.0	4.5	23.5	2.6
Dec	36.8	14.3	25.6	63	1997	29	33.6	1979	-47	1968	29	6.6	1983	1224	0	.0	.0	4.3	8.8	27.3	6.0
Ann	56.7	28.2	42.5	100	Aug 1961	5	67.4	Jul 1985	-47	Dec 1968	29	6.6	Dec 1983	8305	113	.0	8.3	229.3	33.5	197.9	24.7

\+ 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: 1876-2001

(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	.50	.47	1.10	1969	20	1.44	1980	.00	2000
Feb	.37	.36	1.20	1959	16	.82	1980	.01	1992
Mar	.73	.61	1.30	1958	16	1.81	1990	.08	1999
Apr	1.19	1.05	2.25	1975	26	3.60	1975	.13	1981
May	2.72	2.52	2.56	1980	25	7.96	1981	.51	1979
Jun	2.47	2.39	1.68	1968	9	6.19	1998	.58	1971
Jul	1.63	1.06	2.01	1983	10	5.54	1993	.08	1984
Aug	1.44	1.17	1.36	1985	11	4.16	1985	.19	2000
Sep	1.49	1.08	1.62	1988	18	3.53	1985	.01	1990
Oct	.91	.71	1.35	1975	13	4.16	1975	.06	1987
Nov	.55	.49	.65	1973	6	1.57	1973	.15+	1999
Dec	.45	.41	.60	1964	20	1.27	1989	.05	1997
Ann	14.45	13.92	2.56	May 1980	25	7.96	May 1981	.00	Jan 2000

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	5.7	1.5	.1	@
Feb	4.5	1.5	.0	.0
Mar	7.0	2.6	.1	.0
Apr	7.9	3.6	.5	@
May	11.6	6.1	1.6	.5
Jun	11.0	5.8	1.6	.3
Jul	7.8	4.2	.8	.3
Aug	7.4	4.1	.7	.1
Sep	7.1	4.0	.6	.2
Oct	5.7	2.9	.3	.1
Nov	5.6	2.1	.1	.0
Dec	5.5	1.8	.1	.0
Ann	86.8	40.2	6.5	1.5

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	.04	.10	.18	.25	.33	.41	.50	.62	.77	1.02	1.26
Feb	.04	.07	.12	.17	.22	.28	.36	.45	.57	.77	.97
Mar	.16	.23	.33	.43	.53	.63	.75	.89	1.07	1.37	1.65
Apr	.26	.37	.55	.71	.87	1.03	1.22	1.45	1.75	2.22	2.67
May	.67	.93	1.32	1.68	2.02	2.39	2.80	3.29	3.93	4.94	5.89
Jun	.61	.84	1.20	1.52	1.84	2.17	2.54	2.98	3.56	4.48	5.34
Jul	.13	.24	.45	.68	.93	1.21	1.56	1.99	2.58	3.58	4.57
Aug	.20	.32	.53	.73	.94	1.17	1.43	1.76	2.20	2.93	3.62
Sep	.14	.25	.45	.65	.88	1.13	1.43	1.81	2.33	3.19	4.03
Oct	.10	.17	.30	.43	.56	.71	.89	1.11	1.41	1.90	2.38
Nov	.14	.19	.27	.34	.41	.49	.57	.67	.80	1.00	1.19
Dec	.10	.15	.21	.27	.33	.39	.46	.55	.66	.83	1.00
Ann	8.69	9.73	11.11	12.18	13.15	14.10	15.10	16.21	17.58	19.61	21.40

\+ 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: 1876-2001
(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	3.5	-99.9	1	0
Feb	1.4	-99.9	#	#
Mar	4.8	-99.9	1	0
Apr	3.7	.0	#	0
May	2.6	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	#	0
Aug	.0	.0	0	0
Sep	.5	.0	#	0
Oct	2.3	1.8	#	0
Nov	3.4	2.9	#	0
Dec	3.9	-99.9	1	#
Ann	26.1	-9.9	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	1997	10	17.6	1984	14	1984	16	9	1984
Feb	5.0	1982	2	7.0	1984	9	1982	6	2	1982
Mar	10.0	1990	6	19.2	1984	8	1982	24	5	1984
Apr	7.0	1997	4	14.0	1999	4	2000	2	#	2000
May	14.0	1982	29	24.0	1982	26	1983	10	2	1983
Jun	.0	0	0	.0	0	0	0	0	0	0
Jul	.0	0	0	.0	0	2	2000	6	#	2000
Aug	.0	0	0	.0	0	0	0	0	0	0
Sep	4.0	2000	21	5.0	2000	12	1983	19	1	1983
Oct	7.0	1984	16	7.0	1984	7	1984	16	1	1984
Nov	8.0	1996	19	9.4	1998	8	1977	18	2	2000
Dec	7.8	1983	26	7.8	1983	8	1982	27	5	1982
Ann	14.0	May 1982	29	24.0	May 1982	26	May 1983	10	9	Jan 1984

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	2.2	1.5	.6	.4	.0
Feb	.9	.6	.6	.2	.0
Mar	1.6	1.3	.7	.4	.1
Apr	1.7	1.4	.4	.2	.0
May	.4	.4	.3	.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	.7	.6	.3	.1	.0
Nov	2.5	1.8	.4	.2	.0
Dec	2.5	2.0	.9	.3	.0
Ann	12.7	9.8	4.3	2.0	.2

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	.2	.1	.0	.0
May	.2	.2	.2	.2
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.1	.1	.0	.0
Oct	.5	.4	.1	.0
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	8/01	7/27	7/24	7/21	7/19	7/16	7/14	7/11	7/06
32	7/27	7/19	7/14	7/09	7/05	6/30	6/25	6/20	6/12
28	6/26	6/18	6/13	6/08	6/04	5/30	5/26	5/20	5/12
24	5/31	5/25	5/21	5/18	5/15	5/12	5/08	5/04	4/29
20	5/09	5/04	4/30	4/27	4/24	4/22	4/19	4/15	4/10
16	4/30	4/25	4/21	4/17	4/14	4/11	4/08	4/04	3/29

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	7/30	8/03	8/06	8/08	8/11	8/13	8/16	8/19	8/23
32	8/11	8/17	8/21	8/24	8/27	8/30	9/02	9/06	9/11
28	9/02	9/05	9/08	9/10	9/12	9/14	9/16	9/18	9/22
24	9/09	9/13	9/16	9/19	9/22	9/24	9/27	9/30	10/04
20	9/18	9/23	9/26	9/29	10/02	10/05	10/08	10/12	10/17
16	9/25	10/01	10/05	10/09	10/12	10/16	10/19	10/24	10/30

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	41	35	30	26	22	18	14	10	3
32	83	72	65	59	53	47	40	33	23
28	121	114	108	104	99	95	91	85	78
24	148	142	137	133	129	125	121	116	109
20	183	175	170	165	160	156	151	145	137
16	205	197	191	185	180	175	170	164	155

***** 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	1271	1035	979	718	494	267	144	159	378	651	985	1224	8305
60	1116	895	824	568	342	148	61	76	248	496	835	1069	6678
57	1023	811	731	481	258	94	29	42	182	403	753	977	5784
55	962	759	669	425	206	65	16	27	143	342	697	917	5228
50	819	628	516	291	103	19	2	7	67	200	558	774	3984
32	354	236	100	23	0	0	0	0	0	6	186	323	1228

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	106	125	144	296	529	734	921	918	621	378	191	122	5085
55	1	4	0	7	22	109	224	232	74	1	12	3	689
57	0	0	0	4	12	78	174	185	53	0	8	1	515
60	0	0	0	0	3	42	114	126	29	0	0	0	314
65	0	0	0	0	0	10	41	53	9	0	0	0	113
70	0	0	0	0	0	1	10	15	2	0	0	0	28

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	16	23	42	131	307	509	684	681	403	198	54	21	16	39	81	212	519	1028	1712	2393	2796	2994	3048	3069
45	1	2	13	61	180	359	529	527	269	110	24	3	1	3	16	77	257	616	1145	1672	1941	2051	2075	2078
50	0	0	1	22	83	216	375	374	154	44	5	0	0	0	1	23	106	322	697	1071	1225	1269	1274	1274
55	0	0	0	3	28	107	228	227	71	15	1	0	0	0	0	3	31	138	366	593	664	679	680	680
60	0	0	0	0	3	43	104	111	21	2	0	0	0	0	0	0	3	46	150	261	282	284	284	284
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	6	20	47	118	229	337	467	469	313	170	32	5	6	26	73	191	420	757	1224	1693	2006	2176	2208	2213

(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