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: CIRCLE, MT **COOP ID: 241758**

Climate Division: MT 6 **NWS Call Sign:** **Elevation: 2,440 Feet** **Lat: 47˚25N** **Lon: 105˚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	27.0	5.7	16.4	65+	1992	31	30.7	1981	-42+	1982	10	1.4	1979	1510	0	.0	.0	1.0	18.0	30.7	12.4
Feb	34.2	12.5	23.4	70	1992	27	36.5	1984	-35+	1996	3	4.7	1989	1166	0	.0	.0	3.7	11.8	27.3	7.2
Mar	44.7	21.2	33.0	77+	1999	26	42.7	1986	-39	1996	8	20.8	1996	994	0	.0	.0	11.8	6.1	27.6	2.4
Apr	58.3	31.5	44.9	92	1980	21	51.6	1987	-6	1967	1	37.5	1979	603	0	.0	@	22.4	1.0	16.9	.1
May	69.6	42.0	55.8	101	1980	23	62.5	1988	18	1976	2	49.9	1996	305	20	.1	.7	29.5	@	4.0	.0
Jun	79.4	50.7	65.1	107+	1988	26	77.9	1988	30	1992	6	59.1	1998	110	112	.6	4.1	29.9	.0	.1	.0
Jul	86.4	55.2	70.8	108	1983	15	75.4	1989	35	1967	3	61.9	1993	39	219	1.6	11.2	31.0	.0	.0	.0
Aug	86.2	54.2	70.2	109	1983	7	77.9	1983	27	1994	31	62.6	1977	65	225	1.2	11.5	31.0	.0	.1	.0
Sep	73.8	42.9	58.4	105	1983	2	67.0	1998	15	1995	21	53.1	1986	245	45	.2	2.7	28.7	@	3.5	.0
Oct	60.0	32.3	46.2	94	1997	2	49.8	1979	-9	1991	30	42.1	1976	585	0	.0	.1	24.0	.7	15.7	@
Nov	41.5	19.7	30.6	79+	1999	12	42.0	1999	-31	1993	24	16.7	1985	1033	0	.0	.0	8.4	8.2	27.1	2.3
Dec	30.6	9.1	19.9	67	1979	5	30.3	1979	-46	1989	21	2.9	1983	1399	0	.0	.0	1.7	15.8	30.4	9.7
Ann	57.6	31.4	44.6	109	Aug 1983	7	77.9+	Jun 1988	-46	Dec 1989	21	1.4	Jan 1979	8054	621	3.7	30.3	223.1	61.6	183.4	34.1

\+ 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: 1963-2001

(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	.42	.30	.81	1980	6	1.67	1971	.00	1995
Feb	.36	.20	.69	1979	17	1.61	1979	.00+	1990
Mar	.64	.65	.74	1987	21	1.30+	1987	.00	1999
Apr	1.15	.87	2.80	1992	18	3.98	1992	.15	1988
May	1.94	1.66	1.93	1977	18	6.61	1978	.15	1980
Jun	2.39	1.92	3.50	1964	18	7.38	1991	.50	1985
Jul	1.94	1.69	2.30	1964	5	9.33	1993	.04	1984
Aug	1.29	1.36	1.67	1995	18	2.95	1989	.00	1996
Sep	1.35	1.14	2.34	1986	25	5.16	1986	.08	1993
Oct	.93	.57	1.27	1971	19	3.78	1998	.00	1988
Nov	.44	.37	.67	1974	1	1.16	1978	.00	1987
Dec	.43	.37	.66	1982	2	1.54	1982	.00	1997
Ann	13.28	12.57	3.50	Jun 1964	18	9.33	Jul 1993	.00+	Mar 1999

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	5.2	1.3	@	.0
Feb	3.7	1.4	.1	.0
Mar	5.4	2.3	.1	.0
Apr	5.7	3.2	.6	.1
May	7.7	5.0	1.1	.3
Jun	8.0	5.4	1.5	.5
Jul	6.1	4.2	1.2	.3
Aug	5.1	3.0	.9	.2
Sep	5.2	3.0	.8	.3
Oct	4.4	2.5	.5	.1
Nov	4.2	1.6	.1	.0
Dec	5.4	1.6	@	.0
Ann	66.1	34.5	6.9	1.8

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	.02	.06	.12	.18	.25	.32	.41	.51	.66	.90	1.13
Feb	.00	.01	.06	.11	.17	.24	.33	.44	.60	.87	1.13
Mar	.14	.24	.34	.43	.51	.59	.68	.78	.91	1.12	1.31
Apr	.14	.23	.39	.55	.72	.91	1.13	1.40	1.77	2.38	2.97
May	.28	.44	.72	.98	1.27	1.58	1.93	2.37	2.96	3.93	4.86
Jun	.42	.63	.98	1.30	1.64	2.00	2.41	2.91	3.58	4.65	5.68
Jul	.23	.39	.66	.93	1.22	1.54	1.91	2.37	2.99	4.02	5.02
Aug	.10	.23	.44	.63	.83	1.04	1.29	1.60	2.01	2.68	3.32
Sep	.12	.22	.40	.59	.79	1.02	1.30	1.65	2.13	2.93	3.71
Oct	.02	.08	.20	.33	.48	.65	.86	1.13	1.51	2.14	2.78
Nov	.04	.08	.15	.22	.29	.36	.44	.54	.68	.90	1.11
Dec	.06	.11	.19	.25	.31	.37	.45	.53	.65	.83	1.00
Ann	7.49	8.51	9.88	10.95	11.92	12.89	13.90	15.04	16.46	18.56	20.42

+ 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: 1963-2001
(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	6.5	3.0	4	2
Feb	6.3	2.0	4	#
Mar	5.4	4.8	2	#
Apr	1.6	.0	#	0
May	.4	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.2	.0	#	0
Oct	1.3	.0	#	0
Nov	3.9	2.5	1	#
Dec	6.2	5.8	2	1
Ann	31.8	18.1	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	1980	6	24.0	1971	21	1971	31	13	1979
Feb	9.0	1979	15	22.0	1979	33	1979	19	26	1978
Mar	6.0	1982	20	14.0	1975	31	1978	7	13	1978
Apr	6.0	1984	27	7.0+	1984	9	1975	6	3	1975
May	6.0	1983	12	10.0	1983	10	1983	13	1	1983
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	5.5	1984	24	6.0	1984	3	1984	24	#+	1984
Oct	6.0	1985	7	12.0	1985	12	1985	8	2	1985
Nov	7.0	1993	23	12.0	1978	10	1978	28	6	1978
Dec	8.0	1982	2	18.5	1982	13	1985	21	10	1985
Ann	9.0	Feb 1979	15	24.0	Jan 1971	33	Feb 1979	19	26	Feb 1978

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	3.1	2.5	.6	.1	.0
Feb	2.1	1.7	.5	.2	.0
Mar	1.9	1.4	.6	.2	.0
Apr	.7	.6	.2	.1	.0
May	.1	.1	.1	@	.0
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.1	@	@	@	.0
Oct	.7	.5	.1	.1	.0
Nov	2.0	1.6	.3	@	.0
Dec	3.4	2.3	.5	.1	.0
Ann	14.1	10.7	2.9	.8	.0

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	20.6	16.6	13.3	7.1
Feb	11.7	8.7	8.5	7.8
Mar	8.6	5.7	4.3	2.3
Apr	1.6	.8	.5	.0
May	.1	.1	.1	@
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.1	.1	.0	.0
Oct	.9	.3	.2	.1
Nov	4.9	2.6	1.9	.5
Dec	13.8	10.4	8.5	1.6
Ann	62.3	45.3	37.3	19.4

+ 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	6/15	6/08	6/04	5/31	5/27	5/23	5/19	5/15	5/08
32	5/31	5/26	5/22	5/19	5/15	5/12	5/09	5/05	4/29
28	5/15	5/11	5/09	5/06	5/04	5/01	4/29	4/26	4/22
24	5/06	5/02	4/29	4/27	4/24	4/22	4/19	4/16	4/12
20	4/30	4/24	4/20	4/17	4/13	4/10	4/06	4/02	3/27
16	4/17	4/11	4/07	4/03	3/31	3/28	3/24	3/20	3/14

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	8/24	8/29	9/02	9/05	9/07	9/10	9/13	9/17	9/21
32	9/04	9/08	9/11	9/14	9/16	9/19	9/21	9/24	9/28
28	9/09	9/14	9/18	9/22	9/25	9/28	10/01	10/05	10/11
24	9/22	9/28	10/03	10/06	10/09	10/13	10/16	10/21	10/26
20	10/02	10/08	10/12	10/15	10/19	10/22	10/25	10/29	11/04
16	10/04	10/10	10/15	10/19	10/22	10/25	10/29	11/02	11/08

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	121	115	110	106	103	99	95	91	85
32	143	136	131	127	123	119	115	110	103
28	166	158	153	148	143	139	134	129	121
24	190	183	177	172	168	163	158	152	145
20	212	203	197	192	188	183	178	172	163
16	228	220	214	209	204	199	194	189	180

***** 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	1510	1166	994	603	305	110	39	65	245	585	1033	1399	8054
60	1355	1034	839	458	186	48	13	27	143	430	883	1244	6660
57	1265	956	748	375	130	26	6	15	95	339	795	1151	5901
55	1206	903	689	323	99	17	1	9	69	279	741	1089	5425
50	1063	774	545	207	41	4	0	2	24	151	601	938	4350
32	578	381	156	12	0	0	0	0	0	4	210	451	1792

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	91	139	185	399	738	992	1203	1184	790	442	167	74	6404
55	7	17	5	20	124	318	491	480	169	4	8	0	1643
57	4	14	2	12	93	268	434	424	135	2	2	0	1390
60	0	7	0	5	57	200	348	343	94	0	0	0	1054
65	0	0	0	0	20	112	219	225	45	0	0	0	621
70	0	0	0	0	5	50	125	136	18	0	0	0	334

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	0	8	46	205	495	751	962	936	542	239	36	2	0	8	54	259	754	1505	2467	3403	3945	4184	4220	4222
45	0	1	15	115	351	601	807	781	404	140	12	0	0	1	16	131	482	1083	1890	2671	3075	3215	3227	3227
50	0	0	2	57	222	454	652	627	270	66	1	0	0	0	2	59	281	735	1387	2014	2284	2350	2351	2351
55	0	0	0	20	122	310	497	474	165	26	0	0	0	0	0	20	142	452	949	1423	1588	1614	1614	1614
60	0	0	0	4	55	186	344	325	85	6	0	0	0	0	0	4	59	245	589	914	999	1005	1005	1005
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	13	48	155	312	472	609	592	359	182	36	1	0	13	61	216	528	1000	1609	2201	2560	2742	2778	2779

(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