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: CHOTEAU, MT **COOP ID: 241737**

Climate Division: MT 3 **NWS Call Sign:** **Elevation: 3,845 Feet** **Lat: 47˚49N** **Lon: 112˚12W**

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	33.7	13.2	23.5	75	1919	11	38.1	1986	-44	1943	24	9.0	1982	1288	0	.0	.0	4.7	10.6	27.0	7.9
Feb	39.2	17.4	28.3	72	1992	27	40.1	1991	-50	1936	15	12.3	1989	1029	0	.0	.0	8.1	7.3	23.2	5.1
Mar	46.3	23.8	35.1	82	1910	21	44.7	1986	-36	1932	8	25.6	1996	928	0	.0	.0	14.2	3.8	24.7	1.5
Apr	56.0	31.7	43.9	86	1987	28	52.3	1987	-16	1935	2	32.2	1975	635	0	.0	.0	22.2	.9	16.0	.1
May	65.3	40.2	52.8	92+	1936	27	56.9	1987	8	1954	2	47.8	1996	383	2	.0	.1	29.2	.0	4.2	.0
Jun	73.7	47.8	60.8	97+	1990	30	68.2	1988	28+	1951	6	55.1	1998	174	45	.0	1.1	29.9	.0	.2	.0
Jul	81.0	51.7	66.4	105	1893	21	71.3	1985	28	1999	16	58.2	1993	75	117	.1	4.8	31.0	.0	@	.0
Aug	80.9	51.0	66.0	106	1894	26	73.2	1971	29+	1924	30	61.0	1985	98	127	.1	4.8	31.0	.0	.1	.0
Sep	70.3	42.7	56.5	96	1893	3	63.7	1990	-5	1926	24	47.9	1985	292	38	.0	.9	28.3	@	3.4	.0
Oct	59.4	34.7	47.1	90	1992	1	51.6	1974	-15	1919	24	41.3	1984	557	0	.0	@	25.7	.8	12.3	.2
Nov	42.5	23.6	33.1	80	1962	3	41.2	1999	-30+	1955	13	13.6	1985	958	0	.0	.0	10.0	4.9	23.3	2.1
Dec	35.7	16.1	25.9	78	1918	1	35.5	1999	-43	1968	29	7.1	1983	1212	0	.0	.0	5.0	9.0	26.8	5.4
Ann	57.0	32.8	45.0	106	Aug 1894	26	73.2	Aug 1971	-50	Feb 1936	15	7.1	Dec 1983	7629	329	.2	11.7	239.3	37.3	161.2	22.3

\+ 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: 1893-2001

(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	.25	.18	1.20	1893	30	.79	1996	.00	1995
Feb	.19	.12	1.20	1897	16	.59	1996	.00+	1984
Mar	.34	.26	1.05	1981	30	1.33	1981	.04+	1984
Apr	.72	.72	1.37	1975	26	2.05	1975	.00	1981
May	2.00	1.73	2.45	1953	25	5.06	1995	.09	1979
Jun	2.15	1.67	4.10	1964	8	6.82	1991	.60	1985
Jul	1.31	.91	2.30	1909	27	4.34	1995	.03	1985
Aug	1.38	1.09	2.47	1933	21	4.05	1989	.11	2000
Sep	.99	.77	2.12	1968	20	4.16	1985	.02	1990
Oct	.52	.41	1.34	1923	8	3.04	1975	.03	1987
Nov	.25	.21	1.24	1927	5	.90	1998	.00+	1984
Dec	.22	.18	.60+	1928	29	.70	1977	.00	1997
Ann	10.32	10.02	4.10	Jun 1964	8	6.82	Jun 1991	.00+	Dec 1997

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	4.9	.8	.0	.0
Feb	3.6	.6	.0	.0
Mar	4.7	1.0	@	@
Apr	5.1	2.3	.2	@
May	9.1	4.8	1.3	.2
Jun	9.0	5.3	1.1	.3
Jul	7.0	3.6	.6	.2
Aug	7.3	3.6	.8	.1
Sep	5.6	2.6	.5	.1
Oct	4.3	1.5	.2	.0
Nov	4.0	.8	@	.0
Dec	4.7	.5	.0	.0
Ann	69.3	27.4	4.7	.9

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	.03	.06	.10	.14	.18	.24	.31	.41	.57	.74
Feb	.00	.01	.04	.07	.10	.14	.18	.23	.31	.43	.56
Mar	.03	.05	.10	.15	.20	.26	.32	.41	.53	.73	.92
Apr	.03	.10	.20	.31	.42	.55	.70	.88	1.13	1.55	1.96
May	.40	.58	.87	1.14	1.41	1.70	2.04	2.43	2.96	3.81	4.61
Jun	.50	.70	1.01	1.30	1.58	1.87	2.20	2.60	3.12	3.95	4.73
Jul	.09	.18	.34	.52	.73	.96	1.24	1.59	2.09	2.92	3.75
Aug	.16	.26	.45	.65	.85	1.08	1.35	1.69	2.15	2.90	3.64
Sep	.08	.15	.28	.42	.57	.74	.95	1.21	1.57	2.17	2.76
Oct	.03	.06	.12	.20	.28	.37	.49	.63	.84	1.19	1.54
Nov	.00	.00	.03	.07	.11	.16	.22	.30	.41	.60	.79
Dec	.01	.04	.07	.10	.14	.17	.21	.27	.34	.45	.56
Ann	5.21	6.08	7.25	8.18	9.05	9.91	10.82	11.86	13.15	15.09	16.83

\+ 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: 1893-2001
(3) Derived from 1971-2000 serially complete daily data

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Snow (inches)

Snow Totals

Means/Medians (1)

Extremes (2)

Mean Number of Days (1)

Snow Fall >= Thresholds

Snow Depth >= Thresholds

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median	Highest Daily Snow Fall	Year	Day	Highest Monthly Snow Fall	Year	Highest Daily Snow Depth	Year	Day	Highest Monthly Mean Snow Depth	Year	0.1	1.0	3.0	5.0	10.0	1	3	5	10
Jan	6.3	5.8	2	1	8.0	1974	30	14.2	1975	14	1978	31	9	1979	4.2	2.5	.5	.2	.0	7.9	3.3	.7	.0
Feb	4.3	3.0	2	1	7.0	1986	15	16.1	1986	17	1986	21	12	1978	3.1	1.6	.3	.1	.0	4.7	1.8	.7	.4
Mar	6.0	4.5	1	#	6.0	1985	2	15.5	1989	12	1989	3	9	1978	3.1	2.3	.6	.1	.0	4.3	2.0	.9	.0
Apr	4.6	4.0	#	#	8.0	1989	27	12.0+	1991	9	1980	3	1	1999	2.1	1.7	.6	.2	.0	2.2	1.4	.4	.0
May	.8	.0	#	0	6.0	1983	9	6.2	1983	8	1983	10	1	1983	.3	.3	.1	@	.0	.2	.1	.1	.0
Jun	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Jul	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Aug	.2	.0	#	0	3.0	1992	23	5.0	1992	#	1992	23	#	1992	.1	.1	@	.0	.0	.0	.0	.0	.0
Sep	1.0	.0	#	0	5.0	1988	18	9.0	1988	3	2000	22	#+	2000	.4	.3	.1	@	.0	.3	@	.0	.0
Oct	2.8	.6	#	#	10.0	1975	13	21.0	1975	8	1985	8	1	1985	1.1	.8	.3	.2	@	.9	.2	.1	.0
Nov	4.6	3.9	1	#	8.0	1978	9	18.5	1978	12	1985	30	5	1985	3.1	2.2	.4	.1	.0	5.1	2.3	.7	.0
Dec	3.7	3.2	2	1	8.0	1977	7	13.1	1984	12	1985	3	7	1985	3.5	1.8	.3	.2	.0	5.7	2.8	1.3	.3
Ann	34.3	25.0	N/A	N/A	10.0	Oct 1975	13	21.0	Oct 1975	17	Feb 1986	21	12	Feb 1978	21.0	13.6	3.2	1.1	@	31.3	13.9	4.9	.7

+ 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	6/24	6/17	6/12	6/08	6/04	5/30	5/26	5/21	5/14
32	6/09	6/02	5/28	5/24	5/20	5/16	5/12	5/07	4/30
28	5/26	5/19	5/13	5/08	5/04	4/29	4/25	4/19	4/11
24	5/05	4/30	4/26	4/22	4/19	4/15	4/12	4/08	4/02
20	4/21	4/16	4/12	4/09	4/06	4/04	4/01	3/28	3/23
16	4/16	4/10	4/06	4/03	3/30	3/27	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	8/28	9/02	9/06	9/09	9/12	9/15	9/18	9/21	9/26
32	9/05	9/09	9/13	9/16	9/19	9/21	9/24	9/28	10/02
28	9/17	9/22	9/26	9/29	10/02	10/05	10/09	10/13	10/18
24	9/27	10/02	10/06	10/10	10/13	10/16	10/20	10/24	10/29
20	10/06	10/12	10/16	10/20	10/23	10/27	10/30	11/04	11/09
16	10/13	10/20	10/25	10/29	11/02	11/06	11/10	11/15	11/21

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	126	117	111	105	100	94	89	82	73
32	147	138	131	126	121	116	110	104	95
28	183	172	164	157	151	144	137	129	118
24	205	195	188	182	176	171	165	158	148
20	224	215	209	204	199	194	189	183	175
16	244	234	227	221	216	210	204	198	188

***** 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	1288	1029	928	635	383	174	75	98	292	557	958	1212	7629
60	1142	895	773	491	243	88	24	41	187	404	808	1057	6153
57	1056	816	680	408	171	50	11	22	136	315	728	975	5368
55	998	764	620	354	130	32	6	14	106	260	671	916	4871
50	855	635	476	236	56	9	0	4	49	141	535	772	3768
32	421	266	103	18	0	0	0	0	0	4	175	343	1330

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	156	161	198	373	642	861	1065	1052	736	470	207	154	6075
55	19	15	3	19	60	203	358	354	152	13	13	14	1223
57	16	11	0	12	38	161	301	300	122	6	10	11	988
60	9	6	0	6	17	109	221	225	83	2	0	0	678
65	0	0	0	0	2	45	117	127	38	0	0	0	329
70	0	0	0	0	0	14	46	56	15	0	0	0	131

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	25	42	69	193	417	634	834	822	522	285	63	24	25	67	136	329	746	1380	2214	3036	3558	3843	3906	3930
45	4	11	26	106	277	484	680	667	384	173	25	1	4	15	41	147	424	908	1588	2255	2639	2812	2837	2838
50	0	1	1	50	157	337	525	513	252	93	9	0	0	1	2	52	209	546	1071	1584	1836	1929	1938	1938
55	0	0	0	15	74	208	372	361	150	43	0	0	0	0	0	15	89	297	669	1030	1180	1223	1223	1223
60	0	0	0	1	29	104	227	221	71	14	0	0	0	0	0	1	30	134	361	582	653	667	667	667
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	11	27	54	140	262	388	526	521	339	192	40	8	11	38	92	232	494	882	1408	1929	2268	2460	2500	2508

(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

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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