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: BRANDENBERG, MT **COOP ID: 241084**

Climate Division: MT 7 **NWS Call Sign:** **Elevation: 2,770 Feet** **Lat: 45˚49N** **Lon: 106˚14W**

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	34.1	8.5	21.3	67	1992	31	32.7	1986	-36	1985	30	6.4	1979	1354	0	.0	.0	2.9	12.7	30.2	9.4
Feb	41.3	14.5	27.9	72+	1995	24	37.2	1999	-39	1989	2	13.0	1989	1038	0	.0	.0	7.2	7.7	26.6	5.0
Mar	50.7	22.9	36.8	82	1978	30	45.7	1986	-28	1989	4	27.5	1996	874	0	.0	.0	15.9	3.2	26.3	1.5
Apr	62.4	31.9	47.2	91	1980	21	54.5	1987	-2	1997	11	40.1	1997	536	0	.0	.1	24.4	.5	15.6	@
May	72.7	41.2	57.0	101	1988	29	62.3	1988	20+	1984	1	51.5	1996	269	19	.1	1.0	30.2	.0	4.6	.0
Jun	82.7	49.8	66.3	111	1988	20	78.9	1988	28	1982	1	60.7	1998	95	134	.8	5.2	29.9	.0	.1	.0
Jul	91.5	54.3	72.9	110+	1960	20	77.5	1998	34+	1972	4	63.6	1993	25	268	3.1	15.9	31.0	.0	.0	.0
Aug	90.5	52.5	71.5	109+	2001	3	78.6	1983	30	1992	25	65.5	1992	33	234	2.2	14.9	31.0	.0	.1	.0
Sep	77.7	42.0	59.9	105	1960	4	67.1	1998	19	1995	21	55.0	1984	199	45	.2	3.0	29.1	.0	3.4	.0
Oct	63.8	32.4	48.1	93	1963	3	52.3	1979	-12	1991	30	43.5	1984	524	0	.0	.1	26.0	.4	15.0	.1
Nov	46.0	20.5	33.3	81	1999	8	43.6	1999	-32	1959	16	17.9	1985	951	0	.0	.0	10.7	5.5	26.9	2.1
Dec	36.5	11.2	23.9	70	1957	9	33.1	1999	-44	1983	24	4.7	1983	1275	0	.0	.0	3.3	11.3	30.2	6.3
Ann	62.5	31.8	47.2	111	Jun 1988	20	78.9	Jun 1988	-44	Dec 1983	24	4.7	Dec 1983	7173	700	6.4	40.2	241.6	41.3	179.0	24.4

\+ 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: 1956-2001

(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	.65	.51	.80	1975	18	2.29	1971	.09	1992
Feb	.48	.39	.72	2000	25	1.32	1972	.04	1992
Mar	.80	.66	1.05	1995	12	2.23	1989	.07	1999
Apr	1.61	1.49	2.00	1964	25	4.50	1975	.13	1983
May	2.44	2.26	1.67	1970	8	6.09	1978	.52	1998
Jun	2.31	2.20	1.94	1993	7	4.80	1993	.87	1996
Jul	1.16	.86	2.63	1958	3	4.41	1993	.11	1988
Aug	1.02	.81	1.53	1964	29	3.43	1972	.08	1994
Sep	1.23	.92	1.62	1967	13	4.53	1986	.22	1979
Oct	1.37	1.08	2.12	1971	2	5.96	1971	.00	1987
Nov	.70	.64	1.23+	1978	9	2.28	1978	.00	1972
Dec	.59	.50	1.23	1984	23	1.64	1984	.00	1994
Ann	14.36	14.91	2.63	Jul 1958	3	6.09	May 1978	.00+	Dec 1994

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	8.0	2.2	.1	.0
Feb	6.2	1.6	@	.0
Mar	8.1	2.4	.1	.1
Apr	8.3	4.0	.9	.2
May	10.2	5.9	1.7	.3
Jun	9.7	5.7	1.2	.4
Jul	6.7	2.7	.5	.1
Aug	5.7	2.7	.6	.1
Sep	5.7	3.1	.7	.1
Oct	6.3	3.5	.7	.1
Nov	6.4	2.3	.2	@
Dec	6.8	1.9	.1	@
Ann	88.1	38.0	6.8	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	.12	.17	.27	.36	.45	.55	.66	.80	.98	1.27	1.55
Feb	.08	.12	.19	.25	.32	.40	.48	.58	.72	.94	1.15
Mar	.16	.23	.35	.45	.56	.68	.81	.97	1.18	1.52	1.84
Apr	.15	.26	.48	.70	.95	1.22	1.55	1.96	2.52	3.46	4.39
May	.72	.95	1.30	1.60	1.89	2.20	2.53	2.93	3.44	4.24	4.98
Jun	.89	1.10	1.41	1.66	1.91	2.15	2.42	2.73	3.12	3.72	4.27
Jul	.11	.19	.35	.51	.68	.88	1.12	1.41	1.82	2.50	3.16
Aug	.14	.22	.37	.51	.66	.82	1.01	1.24	1.55	2.07	2.56
Sep	.16	.26	.43	.60	.78	.98	1.21	1.50	1.88	2.51	3.12
Oct	.16	.32	.55	.75	.95	1.16	1.40	1.69	2.07	2.68	3.26
Nov	.16	.26	.38	.47	.56	.64	.74	.86	1.00	1.23	1.44
Dec	.06	.13	.23	.31	.40	.50	.60	.73	.90	1.17	1.43
Ann	9.22	10.18	11.42	12.38	13.23	14.07	14.95	15.92	17.11	18.86	20.39

\+ 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: 1956-2001
(3) Derived from 1971-2000 serially complete daily data

Complete documentation available from:
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Climate Division: MT 7 **NWS Call Sign:** **Elevation: 2,770 Feet** **Lat: 45˚49N** **Lon: 106˚14W**

Snow (inches)

Snow Totals

Means/Medians (1)

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median
Jan	7.8	5.5	4	3
Feb	6.2	4.3	4	2
Mar	7.1	4.5	2	1
Apr	4.3	1.5	#	#
May	.7	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.8	.0	#	0
Oct	.9	.0	#	0
Nov	6.3	5.0	1	#
Dec	8.1	7.0	3	2
Ann	42.2	27.8	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	6.0	1971	30	27.0	1971	15	1971	31	10+	1993
Feb	16.0	2000	25	18.2	2000	20	1971	8	15	1979
Mar	12.0	1994	23	21.3	1989	16	1979	4	8	1979
Apr	14.0	1997	5	20.0	1984	14	1997	5	3	1997
May	10.0	1983	12	13.0	1983	7	1983	12	#+	2000
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	8.0	1972	25	8.0+	1984	3	1984	23	#+	2000
Oct	4.5	1993	8	9.0	1976	4	1991	30	1	1991
Nov	11.0	1978	9	27.5	1978	16	1978	10	8	1978
Dec	17.0	1984	23	23.3	1984	22	1984	23	10	1978
Ann	17.0	Dec 1984	23	27.5	Nov 1978	22	Dec 1984	23	15	Feb 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	6.1	3.8	.9	.2	.0
Feb	4.3	2.7	.6	.2	@
Mar	3.8	2.8	.5	.2	@
Apr	1.5	1.2	.5	.3	.1
May	.2	.2	.1	@	@
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.2	.2	.1	.1	.0
Oct	.9	.7	.2	.0	.0
Nov	3.6	2.5	.6	.2	@
Dec	5.4	3.6	.6	.2	@
Ann	26.0	17.7	4.1	1.4	.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	21.1	14.1	8.6	2.5
Feb	13.9	10.1	6.8	2.8
Mar	6.5	4.3	2.5	.5
Apr	1.5	.8	.5	.1
May	.1	@	@	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.1	@	.0	.0
Oct	.9	.2	.0	.0
Nov	6.9	3.8	2.3	.6
Dec	17.6	10.1	5.0	1.2
Ann	68.6	43.4	25.7	7.7

+ 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	6/26	6/18	6/13	6/08	6/04	5/30	5/26	5/20	5/13
32	5/31	5/26	5/22	5/19	5/16	5/13	5/10	5/07	5/02
28	5/19	5/15	5/11	5/08	5/06	5/03	4/30	4/26	4/22
24	5/03	4/29	4/26	4/24	4/22	4/20	4/18	4/15	4/11
20	4/26	4/21	4/17	4/13	4/10	4/07	4/04	3/31	3/25
16	4/17	4/11	4/07	4/03	3/31	3/27	3/24	3/19	3/13

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	9/03	9/05	9/08	9/10	9/11	9/14	9/16	9/19
32	9/05	9/09	9/12	9/14	9/17	9/19	9/21	9/24	9/28
28	9/12	9/17	9/21	9/24	9/27	9/30	10/03	10/07	10/12
24	9/20	9/26	10/01	10/05	10/08	10/12	10/16	10/21	10/27
20	10/01	10/07	10/11	10/15	10/19	10/22	10/26	10/30	11/06
16	10/13	10/19	10/23	10/27	10/30	11/03	11/06	11/11	11/17

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	118	111	106	101	97	93	88	83	76
32	144	137	131	127	122	118	114	108	101
28	166	158	153	148	144	139	135	129	122
24	189	182	177	173	169	165	160	155	148
20	216	207	201	196	191	186	181	174	166
16	236	228	222	217	213	208	203	198	190

***** 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	1354	1038	874	536	269	95	25	33	199	524	951	1275	7173
60	1199	902	719	393	153	40	7	9	105	370	801	1120	5818
57	1108	825	627	312	100	21	2	3	64	282	716	1027	5087
55	1048	773	567	262	71	13	0	2	43	228	661	967	4635
50	905	643	423	156	24	3	0	0	12	116	522	824	3628
32	435	272	74	4	0	0	0	0	0	2	157	362	1306

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	104	157	223	458	772	1029	1267	1224	836	502	196	110	6878
55	4	14	2	26	131	352	554	512	189	14	10	2	1810
57	2	11	1	16	97	300	494	452	150	6	5	0	1534
60	0	4	0	7	58	229	406	365	101	2	0	0	1172
65	0	0	0	0	19	134	268	234	45	0	0	0	700
70	0	0	0	0	4	66	158	131	16	0	0	0	375

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	19	70	236	505	764	992	951	571	264	49	6	1	20	90	326	831	1595	2587	3538	4109	4373	4422	4428
45	0	3	24	135	356	614	837	796	430	150	17	0	0	3	27	162	518	1132	1969	2765	3195	3345	3362	3362
50	0	0	4	64	222	464	682	641	291	66	2	0	0	0	4	68	290	754	1436	2077	2368	2434	2436	2436
55	0	0	0	23	117	319	527	487	177	22	0	0	0	0	0	23	140	459	986	1473	1650	1672	1672	1672
60	0	0	0	7	50	191	373	337	86	4	0	0	0	0	0	7	57	248	621	958	1044	1048	1048	1048
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	1	29	79	190	332	482	614	591	386	208	46	7	1	30	109	299	631	1113	1727	2318	2704	2912	2958	2965

(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