

# Climatology of the United States

## No. 20

### 1971-2000

**Station: BUTTE MOONEY AP, MT**

**COOP ID: 241318**

**Climate Division: MT 2**

**NWS Call Sign: BTM**

**Elevation: 5,540 Feet Lat: 45° 57N**

**Lon: 112° 30W**

### 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	29.7	5.4	17.6	58	1931	29	27.8	1994	-48	1937	7	-1.8	1979	1471	0	.0	.0	.7	16.0	30.1	11.0
Feb	34.7	9.6	22.2	61+	1995	24	32.9	1991	-52	1933	9	7.0	1989	1199	0	.0	.0	1.6	9.7	27.4	7.0
Mar	42.1	18.5	30.3	69	1994	15	38.8	1992	-36	1948	10	17.8	1975	1077	0	.0	.0	7.4	5.1	29.9	2.4
Apr	51.6	26.4	39.0	83	1910	25	45.2	1987	-16	1982	8	24.9	1975	781	0	.0	.0	16.0	1.1	24.6	.2
May	60.8	34.3	47.6	90	1919	28	52.5	1976	9+	1975	1	40.2	1975	540	0	.0	.0	26.0	.1	11.7	.0
Jun	70.7	41.4	56.1	100	2000	30	61.6	1988	22	1916	6	50.7	1975	278	9	@	.4	29.4	.0	2.6	.0
Jul	79.8	45.5	62.7	100	1931	22	67.2+	1998	28	1971	7	54.7	1993	129	55	.0	3.1	30.9	.0	.3	.0
Aug	79.0	44.1	61.6	99+	2000	3	66.9	1971	23	1992	25	55.2	1975	165	57	.0	2.7	30.8	.0	.7	.0
Sep	67.8	35.3	51.6	93+	2000	15	58.2	1998	3	1926	24	45.2	1985	410	6	.0	.4	27.3	@	10.9	.0
Oct	55.5	26.2	40.9	85	1918	5	46.9	1988	-23	1991	30	37.3	1971	748	0	.0	.0	21.2	.8	25.5	.1
Nov	38.9	15.3	27.1	70	1999	12	38.3	1999	-42	1959	13	12.9	1985	1137	0	.0	.0	5.6	8.1	28.3	4.4
Dec	29.9	5.7	17.8	66	1917	27	31.2	1980	-52	1983	23	4.0	1983	1464	0	.0	.0	.9	17.4	30.0	10.8
Ann	53.4	25.6	39.5	100+	2000	30	67.2+	1998	-52+	1983	23	-1.8	1979	9399	127	@	6.6	197.8	58.3	222.0	35.9

+ 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/normal/usnormals.html](http://www.ncdc.noaa.gov/oa/climate/normal/usnormals.html)

Issue Date: February 2004

(1) From the 1971-2000 Monthly Normals

(2) Derived from station's available digital record: 1880-2001

(3) Derived from 1971-2000 serially complete daily data

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### Precipitation (inches)

		Precipitation Totals								Mean Number of Days (3)				Precipitation Probabilities (1) Probability that the monthly/annual precipitation will be equal to or less than the indicated amount										
		Means/Medians(1)		Extremes						Daily Precipitation				Monthly/Annual Precipitation vs Probability Levels These values were determined from the incomplete gamma distribution										
Month	Mean	Median	Highest Daily(2)	Year	Day	Highest Monthly(1)	Year	Lowest Monthly(1)	Year	>= 0.01	>= 0.10	>= 0.50	>= 1.00	.05	.10	.20	.30	.40	.50	.60	.70	.80	.90	.95
Jan	.53	.44	1.00	1899	28	1.40+	1997	.07	1981	8.0	1.4	.2	.0	.08	.13	.21	.28	.36	.44	.53	.65	.81	1.06	1.31
Feb	.47	.48	.90	1904	12	1.26	1996	.04	1977	7.5	1.4	@	.0	.11	.15	.22	.28	.34	.41	.48	.57	.68	.86	1.03
Mar	.83	.81	1.20+	1918	8	1.84	1982	.25	1994	10.8	2.9	.1	.0	.32	.40	.51	.60	.69	.78	.87	.98	1.13	1.35	1.55
Apr	1.02	.95	1.10+	1911	27	2.46	1975	.12	1974	10.1	3.4	.2	@	.22	.31	.46	.60	.73	.88	1.05	1.24	1.50	1.92	2.32
May	2.02	1.82	2.50	1927	28	4.81	1981	.46	1979	13.1	5.9	.8	.2	.65	.84	1.12	1.36	1.60	1.84	2.10	2.41	2.81	3.42	3.99
Jun	2.07	1.80	3.00+	1913	9	4.62+	1995	.29	1974	12.1	5.8	.9	.1	.42	.61	.91	1.19	1.47	1.77	2.11	2.52	3.06	3.93	4.76
Jul	1.47	1.14	1.34	1937	31	4.18	1987	.07	1999	9.3	4.5	.6	.2	.14	.24	.44	.65	.87	1.12	1.42	1.79	2.30	3.14	3.97
Aug	1.36	1.40	2.02	1943	2	3.10	1993	.15	1988	9.1	4.2	.6	.1	.24	.36	.56	.74	.93	1.14	1.37	1.66	2.04	2.65	3.23
Sep	1.09	.87	1.45	1908	17	3.15	1977	.07+	1990	7.5	3.3	.4	.0	.09	.16	.30	.45	.61	.81	1.03	1.32	1.72	2.39	3.05
Oct	.79	.61	2.30	1911	10	3.06	1975	.00	1987	6.8	2.7	.2	@	.07	.16	.29	.41	.52	.65	.80	.97	1.20	1.58	1.94
Nov	.60	.56	1.20	1921	20	1.50	1994	.15+	1999	8.5	1.8	.1	.0	.15	.21	.29	.37	.45	.53	.62	.73	.86	1.09	1.29
Dec	.53	.51	1.28	1919	11	1.99	1996	.07	1976	8.5	1.6	.1	.0	.11	.16	.23	.30	.38	.45	.54	.64	.78	1.00	1.21
Ann	12.78+	12.33+	3.00+	Jun 1913	9	4.81	May 1981	.00	Oct 1987	111.3	38.9	4.2	.6	7.46	8.41	9.67	10.66	11.55	12.43	13.36	14.39	15.68	17.57	19.25

+ 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: 1880-2001

(3) Derived from 1971-2000 serially complete daily data

Complete documentation available from:

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Elevation: 5,540 Feet

Lat: 45° 57N

Lon: 112° 30W

Snow (inches)																							
Snow Totals															Mean Number of Days (1)								
Means/Medians (1)					Extremes (2)										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	8.4	6.6	4	3	9.0	1975	25	21.2	1989	15+	1982	24	10+	1997	7.8	2.6	.6	.2	.0	27.3	18.5	10.8	2.2
Feb	7.6	7.0	4	3	8.8	1996	24	21.3	1996	19	1975	8	11	1975	7.6	2.6	.4	.2	.0	21.6	13.1	8.4	3.1
Mar	10.7	9.2	2	2	7.1	1980	5	26.5	1982	17+	1989	5	6+	1997	9.6	3.7	.8	.3	.0	14.9	7.7	4.8	.6
Apr	8.6	7.0	#	1	11.7	1979	23	31.0	1975	13+	1975	27	7	1975	6.6	2.9	.7	.2	@	4.6	2.1	1.1	.4
May	3.3	2.2	#	1	7.5	1999	30	13.0	1982	9	1975	6	1	1975	2.7	1.0	.3	.1	.0	1.2	.4	.2	.0
Jun	.2	.0	#	0	1.0	1980	2	2.1	1980	1+	1982	8	#	1999	.4	.0	.0	.0	.0	.1	.0	.0	.0
Jul	.0	.0	#	0	.0	0	0	.0	0	0	0	0	#	1982	.0	.0	.0	.0	.0	.0	.0	.0	.0
Aug	.3	.0	#	0	5.0	1993	26	5.0	1993	2	1992	23	#	1992	.1	.1	@	@	.0	@	.0	.0	.0
Sep	1.1	.0	#	0	4.4	1983	18	9.2	1988	5	1988	18	#	2000	.8	.4	.1	.0	.0	.3	.1	@	.0
Oct	4.5	2.8	#	0	12.8	1973	31	13.2	1973	8	1980	16	1+	1991	3.2	1.5	.4	.1	@	2.1	.8	.3	.0
Nov	7.4	6.9	1	1	8.8	1994	26	17.4	1994	12	1986	12	6	2000	7.2	2.6	.5	.1	.0	11.6	5.7	3.0	.4
Dec	8.3	7.6	3	2	12.7	1998	3	29.6	1996	27+	1996	29	10	1978	8.5	2.9	.4	.2	.1	24.0	15.0	8.5	1.4
Ann	60.4	49.3	N/A	N/A	12.8	Oct 1973	31	31.0	Apr 1975	27+	Dec 1996	29	11	Feb 1975	54.5	20.3	4.2	1.4	.1	107.7	63.4	37.1	8.1

+ 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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<b>Freeze Data</b>									
<b>Spring Freeze Dates (Month/Day)</b>									
<b>Temp (F)</b>	<b>Probability of later date in spring (thru Jul 31) than indicated(*)</b>								
	<b>.10</b>	<b>.20</b>	<b>.30</b>	<b>.40</b>	<b>.50</b>	<b>.60</b>	<b>.70</b>	<b>.80</b>	<b>.90</b>
<b>36</b>	7/25	7/19	7/14	7/09	7/06	7/02	6/28	6/23	6/16
<b>32</b>	7/07	7/01	6/27	6/23	6/20	6/17	6/13	6/09	6/03
<b>28</b>	6/17	6/10	6/04	5/31	5/27	5/23	5/18	5/13	5/06
<b>24</b>	5/22	5/17	5/13	5/09	5/06	5/03	4/30	4/26	4/20
<b>20</b>	5/15	5/07	5/02	4/28	4/24	4/19	4/15	4/10	4/03
<b>16</b>	4/28	4/23	4/19	4/15	4/12	4/09	4/05	4/01	3/26
<b>Fall Freeze Dates (Month/Day)</b>									
<b>Temp (F)</b>	<b>Probability of earlier date in fall (beginning Aug 1) than indicated(*)</b>								
	<b>.10</b>	<b>.20</b>	<b>.30</b>	<b>.40</b>	<b>.50</b>	<b>.60</b>	<b>.70</b>	<b>.80</b>	<b>.90</b>
<b>36</b>	8/08	8/13	8/17	8/20	8/23	8/26	8/29	9/02	9/07
<b>32</b>	8/21	8/25	8/29	8/31	9/03	9/05	9/08	9/12	9/16
<b>28</b>	9/05	9/08	9/10	9/13	9/15	9/17	9/19	9/21	9/25
<b>24</b>	9/11	9/16	9/20	9/23	9/26	9/28	10/01	10/05	10/10
<b>20</b>	9/19	9/24	9/28	10/02	10/05	10/08	10/11	10/15	10/21
<b>16</b>	10/01	10/07	10/12	10/15	10/19	10/22	10/26	10/31	11/06
<b>Freeze Free Period</b>									
<b>Temp (F)</b>	<b>Probability of longer than indicated freeze free period (Days)</b>								
	<b>.10</b>	<b>.20</b>	<b>.30</b>	<b>.40</b>	<b>.50</b>	<b>.60</b>	<b>.70</b>	<b>.80</b>	<b>.90</b>
<b>36</b>	73	64	58	53	48	43	37	31	22
<b>32</b>	97	89	83	79	74	70	65	59	52
<b>28</b>	134	126	120	115	110	105	100	94	86
<b>24</b>	165	157	151	146	142	137	132	126	118
<b>20</b>	191	181	175	169	163	158	152	145	136
<b>16</b>	215	206	200	194	189	184	179	173	164

\* 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)

Base	Heating Degree Days (1)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Below 65	1471	1199	1077	781	540	278	129	165	410	748	1137	1464	9399
60	1316	1059	922	631	387	156	52	82	275	593	987	1309	7769
57	1223	975	829	545	301	100	24	47	205	500	897	1216	6862
55	1161	919	767	488	246	70	14	31	163	439	837	1154	6289
50	1006	779	614	352	133	21	1	9	79	288	695	999	4976
32	494	341	176	47	2	0	0	0	0	14	256	483	1813

### Cooling Degree Days (1)

Base	Cooling Degree Days (1)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Above 32	46	66	123	256	485	721	949	915	586	289	109	42	4587
55	0	0	0	7	16	101	249	233	59	0	0	0	665
57	0	0	0	3	9	71	198	187	41	0	0	0	509
60	0	0	0	0	2	37	133	129	22	0	0	0	323
65	0	0	0	0	0	9	55	57	6	0	0	0	127
70	0	0	0	0	0	1	15	18	1	0	0	0	35

### 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	0	17	88	260	490	710	675	364	120	15	0	0	0	17	105	365	855	1565	2240	2604	2724	2739	2739
45	0	0	0	35	144	343	556	522	234	50	1	0	0	0	0	35	179	522	1078	1600	1834	1884	1885	1885
50	0	0	0	10	63	211	402	372	128	13	0	0	0	0	0	10	73	284	686	1058	1186	1199	1199	1199
55	0	0	0	0	19	108	253	229	52	1	0	0	0	0	0	0	19	127	380	609	661	662	662	662
60	0	0	0	0	1	42	126	107	15	0	0	0	0	0	0	0	1	43	169	276	291	291	291	291
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	0	1	24	90	190	324	466	454	285	133	17	0	0	1	25	115	305	629	1095	1549	1834	1967	1984	1984

(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.  
Complete documentation for the 1971-2000 Normals is available on the internet from:  
[www.ncdc.noaa.gov/oa/climate/normal/usnormals.html](http://www.ncdc.noaa.gov/oa/climate/normal/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/normal.html](http://www.ncdc.noaa.gov/normal.html)  
U.S. Climate Normals 1971-2000-Products Clim20, [www.ncdc.noaa.gov/oa/climate/normal/usnormalsprods.html](http://www.ncdc.noaa.gov/oa/climate/normal/usnormalsprods.html)  
Snow Climatology Project Description, [www.ncdc.noaa.gov/oa/climate/monitoring/snowclim/mainpage.html](http://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](http://www1.ncdc.noaa.gov/pub/data/special/serialcomplete_jam_0900.pdf)