

# Climatology of the United States

## No. 20

National Climatic Data Center  
Federal Building  
151 Patton Avenue  
Asheville, North Carolina 28801  
www.ncdc.noaa.gov

**Station: SWEETGRASS, MT**

**1971-2000**

**COOP ID: 248093**

**Climate Division: MT 3**

**NWS Call Sign:**

**Elevation: 3,466 Feet Lat: 49°00N**

**Lon: 111°58W**

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	30.4	8.4	19.4	64	1958	7	34.0	1986	-39	1957	25	1.7	1982	1413	0	.0	.0	2.4	13.4	29.0	10.7
Feb	36.1	13.4	24.8	70	1992	27	37.7	1977	-35	1994	8	11.1	1979	1127	0	.0	.0	5.2	9.4	25.3	6.5
Mar	44.6	21.6	33.1	72	1966	29	42.1	1992	-29	1960	3	24.6	1996	988	0	.0	.0	12.5	5.3	26.6	1.9
Apr	56.6	31.0	43.8	84+	1987	29	51.0	1987	-7	1975	6	32.4	1975	636	0	.0	.0	21.8	1.0	17.0	.1
May	66.4	40.3	53.4	91	1986	30	57.7	1987	16	1967	3	47.7	1996	365	4	.0	.1	29.4	.0	5.1	.0
Jun	74.1	47.8	61.0	96+	1987	15	67.6	1988	30+	1998	3	56.7	1998	162	40	.0	.8	30.0	.0	.2	.0
Jul	80.8	51.9	66.4	102	1960	19	71.3	1985	35	1961	26	58.1	1993	82	122	@	4.3	31.0	.0	.0	.0
Aug	81.2	51.2	66.2	105	1961	5	73.7	1971	30	1982	5	59.8	1993	101	137	.1	4.7	30.9	.0	.2	.0
Sep	70.9	42.1	56.5	95+	1991	1	63.3	1998	12	1957	19	47.7	1985	296	40	.0	.6	28.4	.1	4.0	.0
Oct	59.4	32.6	46.0	88	1979	10	51.4	1974	-12	1991	29	39.6	1984	589	0	.0	.0	25.4	1.3	14.5	.2
Nov	41.3	20.0	30.7	74+	1981	2	40.7	1987	-26+	1985	27	11.3	1985	1030	0	.0	.0	8.4	6.4	25.9	2.8
Dec	32.5	11.3	21.9	67	1980	16	34.8	1999	-44	1984	29	1.2	1983	1336	0	.0	.0	2.7	12.1	29.0	7.6
Ann	56.2	31.0	43.6	105	Aug 1961	5	73.7	Aug 1971	-44	Dec 1984	29	1.2	Dec 1983	8125	343	.1	10.5	228.1	49.0	176.8	29.8

+ 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: 1951-2001

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

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**NWS Call Sign:**

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**Lon: 111°58W**

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	Med-ian	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	.30	.21	.40+	1972	2	1.25	1972	.00+	1997	3.5	1.3	.0	.0	.00	.03	.08	.13	.18	.23	.29	.37	.48	.66	.83
Feb	.23	.19	.45	1958	26	.62	1974	.00	1983	2.7	.7	.0	.0	.01	.03	.06	.09	.13	.17	.22	.28	.36	.49	.63
Mar	.58	.44	1.20	1990	13	2.94	1990	.00+	1978	3.5	1.7	.4	.1	.00	.01	.07	.15	.25	.36	.51	.70	.97	1.45	1.93
Apr	1.00	.85	3.25	1967	20	2.83	1975	.00+	1997	5.1	3.0	.5	.1	.00	.00	.14	.32	.50	.71	.95	1.25	1.67	2.34	3.01
May	2.61	2.17	2.05	1964	3	6.17	1981	.89	1999	8.0	5.4	1.6	.5	.83	1.08	1.44	1.76	2.06	2.38	2.72	3.12	3.65	4.46	5.21
Jun	3.13	3.01	3.17	1951	24	7.32	1991	.30	1985	8.6	6.3	1.7	.6	.76	1.05	1.51	1.92	2.32	2.75	3.22	3.79	4.53	5.71	6.82
Jul	1.96	1.31	2.30	1993	25	8.68	1993	.00	1984	6.9	4.8	1.1	.3	.03	.14	.38	.64	.96	1.33	1.78	2.36	3.19	4.61	6.03
Aug	1.94	1.79	3.51	1978	23	5.81	1978	.30	1984	8.2	4.7	1.1	.3	.38	.55	.84	1.10	1.36	1.65	1.97	2.36	2.88	3.71	4.50
Sep	1.45	1.01	1.90	1988	11	5.01	1996	.00	1979	6.0	3.4	.7	.2	.03	.12	.31	.51	.74	1.02	1.34	1.77	2.36	3.36	4.36
Oct	.62	.48	1.26	1994	12	2.67	1994	.02+	1987	3.9	2.0	.2	@	.02	.05	.12	.20	.30	.41	.56	.74	1.01	1.47	1.94
Nov	.45	.30	2.50	1990	23	3.01	1990	.00+	1988	3.3	1.3	.2	.1	.00	.00	.03	.12	.21	.30	.42	.57	.77	1.11	1.45
Dec	.30	.24	.75	1988	14	.90	1977	.00+	1999	2.9	1.3	@	.0	.00	.00	.04	.08	.13	.19	.27	.37	.50	.75	.99
Ann	14.57	12.45	3.51	Aug 1978	23	8.68	Jul 1993	.00+	Dec 1999	62.6	35.9	7.5	2.2	7.05	8.30	10.01	11.38	12.66	13.93	15.29	16.83	18.77	21.68	24.30

+ 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: 1951-2001

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

Complete documentation available from:  
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**Climate Division: MT 3**

**NWS Call Sign:**

**Elevation: 3,466 Feet**

**Lat: 49°00N**

**Lon: 111°58W**

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	1.9	#	1	#	6.0	1975	20	9.5	1975	7	1974	4	5	1971	1.1	1.0	.1	.1	.0	-9.9	-9.9	-9.9	-9.9
Feb	2.6	.0	#	0	6.0	1982	22	7.0	1974	4	1972	29	3	1971	.3	.3	.2	.1	.0	-9.9	-9.9	-9.9	-9.9
Mar	1.7	#	#	0	10.0	1982	16	10.0	1982	4	1972	25	1	1972	.6	.3	.2	.1	.1	-9.9	-9.9	-9.9	-9.9
Apr	1.8	.0	#	0	12.0	1974	27	14.0	1974	4	1974	27	#+	1997	.2	.2	.1	.1	.1	.1	.1	.0	.0
May	#	.0	0	0	#	1975	19	#+	1975	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.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	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Sep	.1	.0	0	0	2.5	1972	27	2.5	1972	0	0	0	0	0	.1	.1	.0	.0	.0	.0	.0	.0	.0
Oct	.1	.0	#	0	1.0	1972	29	1.0	1972	2+	1984	19	#+	1984	.1	.1	.0	.0	.0	.1	.0	.0	.0
Nov	1.0	#	#	0	3.0	1980	30	3.1	1983	7	1973	5	1	1973	.4	.2	.1	.0	.0	-9.9	-9.9	-9.9	-9.9
Dec	1.3	-99.9	1	#	4.0	1977	6	4.0	1977	12	1977	6	7	1977	1.0	.7	.2	.0	.0	-9.9	-9.9	-9.9	-9.9
Ann	10.5	-9.9	N/A	N/A	12.0	Apr 1974	27	14.0	Apr 1974	12	Dec 1977	6	7	Dec 1977	3.8	2.9	.9	.4	.2	-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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**Elevation: 3,466 Feet**

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**Lon: 111°58W**

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	6/18	6/13	6/09	6/06	6/02	5/29	5/25	5/19
32	6/05	5/31	5/28	5/25	5/22	5/20	5/17	5/13	5/08
28	5/16	5/11	5/07	5/04	5/02	4/29	4/26	4/22	4/17
24	5/08	5/03	4/29	4/25	4/22	4/19	4/16	4/12	4/06
20	4/26	4/20	4/16	4/13	4/09	4/06	4/03	3/29	3/24
16	4/17	4/11	4/08	4/05	4/02	3/30	3/27	3/23	3/18
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	8/20	8/26	8/30	9/03	9/07	9/10	9/14	9/18	9/24
32	8/31	9/06	9/10	9/14	9/17	9/20	9/24	9/28	10/03
28	9/18	9/22	9/25	9/28	9/30	10/03	10/06	10/09	10/13
24	9/24	9/29	10/03	10/06	10/09	10/12	10/15	10/19	10/24
20	10/03	10/08	10/13	10/16	10/19	10/23	10/26	10/30	11/05
16	10/11	10/17	10/21	10/25	10/29	11/01	11/05	11/09	11/15
Freeze Free Period									
Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	114	107	101	96	92	88	83	78	70
32	138	131	126	121	117	113	108	103	95
28	174	166	160	156	151	147	142	136	129
24	191	183	178	173	169	164	160	154	147
20	218	209	203	197	192	187	182	176	167
16	233	225	219	214	209	204	199	193	185

\* 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

Complete documentation available from:  
[www.ncdc.noaa.gov/oa/climate/normal/usnormals.html](http://www.ncdc.noaa.gov/oa/climate/normal/usnormals.html)

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Degree Days to Selected Base Temperatures (°F)													
Base	Heating Degree Days (1)												
Below	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
65	1413	1127	988	636	365	162	82	101	296	589	1030	1336	8125
60	1260	997	833	492	229	76	28	44	191	436	880	1181	6647
57	1178	918	740	408	160	40	13	24	140	347	796	1101	5865
55	1119	865	679	356	122	24	8	16	110	292	741	1042	5374
50	973	737	533	237	53	5	0	4	52	170	601	898	4263
32	513	355	133	18	0	0	0	0	0	6	215	450	1690

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	123	152	168	372	661	869	1064	1060	734	440	175	137	5955
55	16	19	1	20	71	203	358	362	155	13	11	16	1245
57	13	15	0	13	47	159	301	309	124	6	6	13	1006
60	3	10	0	6	22	105	223	235	86	2	0	0	692
65	0	0	0	0	4	40	122	137	40	0	0	0	343
70	0	0	0	0	0	11	51	65	16	0	0	0	143

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	8	22	49	183	417	628	817	812	503	247	38	2	8	30	79	262	679	1307	2124	2936	3439	3686	3724	3726
45	0	2	15	95	275	478	662	657	363	141	15	1	0	2	17	112	387	865	1527	2184	2547	2688	2703	2704
50	0	1	0	44	157	330	508	502	236	67	5	0	0	1	1	45	202	532	1040	1542	1778	1845	1850	1850
55	0	0	0	16	73	195	354	351	132	25	0	0	0	0	0	16	89	284	638	989	1121	1146	1146	1146
60	0	0	0	2	27	97	212	213	59	7	0	0	0	0	0	2	29	126	338	551	610	617	617	617
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	1	18	43	135	266	379	515	517	326	174	27	0	1	19	62	197	463	842	1357	1874	2200	2374	2401	2401

(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:

[www.ncdc.noaa.gov/oa/climate/normals/usnormals.html](http://www.ncdc.noaa.gov/oa/climate/normals/usnormals.html)

## 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 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.

- |   |   |
|---|---|
| <ol style="list-style-type: none"><li>a. Temperature/ Precipitation Tables<ol style="list-style-type: none"><li>1. 1971-2000 Monthly Normals</li><li>2. Cooperative Summary of the Day</li><li>3. National Weather Service station records</li><li>4. 1971-2000 serially complete daily data</li></ol></li><li>b. Degree Day Table<ol style="list-style-type: none"><li>1. Monthly and Annual Heating and Cooling Degree Days Normals to Selected Bases derived from 1971-2000 Monthly Normals</li><li>2. Daily Normal Growing Degree Units to Selected Base Temperatures derived from 1971-2000 serially complete daily data</li></ol></li></ol> | <ol style="list-style-type: none"><li>c. Snow Tables<ol style="list-style-type: none"><li>1. Snow Climatology</li><li>2. Cooperative Summary of the Day</li></ol></li><li>d. Freeze Data Table<br/>1971-2000 serially complete daily data</li></ol> |
|---|---|

## 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)