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: SONNETTE 2 WNW, MT **COOP ID: 247740**

Climate Division: MT 7 **NWS Call Sign:** **Elevation: 3,900 Feet** **Lat: 45˚25N** **Lon: 105˚52W**

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	30.9	3.7	17.3	68	1992	31	28.5	1981	-38	1985	30	2.2	1979	1479	0	.0	.0	2.7	12.9	30.6	10.3
Feb	36.8	10.1	23.5	70	1982	21	33.4	1992	-42	1989	3	8.5	1989	1164	0	.0	.0	6.1	8.2	27.7	5.5
Mar	44.9	19.1	32.0	77	1978	29	40.3	1986	-24	1989	4	24.4	1996	1023	0	.0	.0	13.0	4.6	28.9	2.2
Apr	55.0	28.5	41.8	87	1980	21	48.9	1987	-8	1997	11	35.1	1975	697	0	.0	.0	21.4	1.1	20.4	.2
May	65.0	37.7	51.4	103	1969	26	56.2	1988	11	1967	3	46.5	1983	426	3	.0	.2	28.6	@	7.5	.0
Jun	75.3	46.1	60.7	105	1988	20	73.6	1988	26	1982	1	54.8	1998	185	56	.2	2.2	29.9	.0	.9	.0
Jul	84.0	51.3	67.7	104+	1989	8	72.1	1988	33	1968	31	59.7	1993	59	141	.7	9.0	31.0	.0	.0	.0
Aug	83.6	50.0	66.8	103	1983	7	73.9	1983	25	1992	25	61.1	1993	82	139	.3	9.0	31.0	.0	.1	.0
Sep	71.5	39.2	55.4	100	1983	1	62.7	1998	10	1984	25	50.2	1985	311	22	@	2.2	28.6	.1	5.8	.0
Oct	58.8	29.4	44.1	90+	1997	2	47.7	1973	-16	1991	30	38.4	1984	648	0	.0	.1	24.2	.6	18.8	.1
Nov	41.8	16.1	29.0	77+	1999	13	40.9	1999	-25	1977	21	12.9	1985	1082	0	.0	.0	9.5	6.4	28.4	2.4
Dec	32.7	6.2	19.5	66	1990	9	29.8	1999	-44	1983	24	2.1	1983	1412	0	.0	.0	3.4	11.8	30.6	7.3
Ann	56.7	28.1	42.4	105	Jun 1988	20	73.9	Aug 1983	-44	Dec 1983	24	2.1	Dec 1983	8568	361	1.2	22.7	229.4	45.7	199.7	28.0

\+ 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: 1965-2001

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

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Climate Division: MT 7 **NWS Call Sign:** **Elevation: 3,900 Feet** **Lat: 45˚25N** **Lon: 105˚52W**

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	.52	.29	.73	1975	18	2.12	1971	.00+	2000
Feb	.42	.36	1.40	1999	26	1.40	1999	.00+	1985
Mar	.79	.64	1.05	1995	12	1.95	1989	.00	1976
Apr	1.61	1.26	2.44	1984	26	4.48	1984	.12	1972
May	2.53	2.29	2.87	1978	18	10.53	1978	.28	1998
Jun	2.51	2.23	2.16	1991	3	4.99	1975	.47	1988
Jul	1.65	1.29	2.36	1974	3	7.26	1993	.02	1980
Aug	1.04	.82	2.58	1980	15	3.55	1980	.18	1990
Sep	1.25	.95	2.23	1986	25	6.40	1986	.00	1997
Oct	1.29	1.04	1.76	1974	31	5.70	1971	.00	1978
Nov	.67	.63	1.38	1978	9	2.14	1978	.00+	1997
Dec	.50	.41	1.01	1984	23	1.28+	1989	.00+	2000
Ann	14.78	14.03	2.87	May 1978	18	10.53	May 1978	.00+	Dec 2000

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	3.0	1.5	.2	.0
Feb	3.3	1.3	.1	@
Mar	4.0	2.9	.2	@
Apr	5.9	3.9	.8	.2
May	9.1	5.8	1.5	.3
Jun	8.7	5.9	1.5	.4
Jul	6.7	3.9	.9	.3
Aug	5.2	2.9	.4	.1
Sep	5.3	3.2	.7	.2
Oct	4.7	3.1	.7	.2
Nov	3.3	2.1	.4	@
Dec	3.4	1.5	.1	@
Ann	62.6	38.0	7.5	1.7

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	.00	.00	.07	.16	.26	.37	.49	.65	.87	1.23	1.59
Feb	.00	.04	.12	.18	.25	.33	.42	.52	.67	.91	1.14
Mar	.12	.22	.36	.47	.58	.70	.82	.98	1.18	1.49	1.79
Apr	.13	.23	.44	.66	.91	1.19	1.53	1.96	2.55	3.54	4.52
May	.48	.70	1.07	1.42	1.76	2.14	2.57	3.08	3.76	4.86	5.90
Jun	.78	1.02	1.37	1.68	1.97	2.28	2.61	3.01	3.52	4.32	5.05
Jul	.09	.19	.38	.61	.86	1.16	1.52	1.99	2.65	3.77	4.89
Aug	.20	.29	.44	.58	.72	.88	1.05	1.26	1.54	1.99	2.42
Sep	.05	.15	.33	.51	.71	.94	1.21	1.54	2.00	2.77	3.52
Oct	.06	.18	.37	.56	.77	.99	1.26	1.58	2.03	2.77	3.50
Nov	.00	.00	.23	.35	.46	.57	.70	.85	1.04	1.36	1.66
Dec	.00	.00	.00	.19	.30	.41	.53	.66	.84	1.13	1.40
Ann	9.18	10.21	11.56	12.60	13.54	14.46	15.42	16.50	17.82	19.76	21.46

+ 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: 1965-2001
(3) Derived from 1971-2000 serially complete daily data

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Climate Division: MT 7 **NWS Call Sign:** **Elevation: 3,900 Feet** **Lat: 45°25N** **Lon: 105°52W**

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	5.0	-99.9	1	0	10.0	1971	30	10.0	1971	26	1971	31	8	1971	-9.9	-9.9	-9.9	-9.9	-9.9	-9.9	-9.9	-9.9	-9.9
Feb	1.5	-99.9	2	0	3.0	1971	3	3.0	1971	30	1971	8	23	1971	-9.9	-9.9	-9.9	-9.9	-9.9	-9.9	-9.9	-9.9	-9.9
Mar	2.2	.0	1	0	4.0	1973	13	6.0	1973	12	1971	4	5	1971	-9.9	-9.9	-9.9	-9.9	-9.9	2.5	2.2	1.6	.6
Apr	-99.9	-99.9	#	0	.0	0	0	.0	0	48	1984	27	7	1984	-9.9	-9.9	-9.9	-9.9	-9.9	.3	.1	.0	.0
May	.0	.0	0	0	.0	0	0	.0	0	22	1984	1	2	1984	-9.9	-9.9	-9.9	-9.9	-9.9	.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	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	-9.9	-9.9	-9.9	-9.9	-9.9	.0	.0	.0	.0
Oct	.2	-99.9	#	0	1.0	1973	31	1.0	1973	8	1971	2	1	1971	-9.9	-9.9	-9.9	-9.9	-9.9	.1	.0	.0	.0
Nov	3.4	-99.9	0	0	12.0	1976	30	17.1	1976	18	1976	30	3	1975	-9.9	-9.9	-9.9	-9.9	-9.9	.9	.9	.7	.5
Dec	2.0	-99.9	1	0	6.0	1977	30	8.0	1971	6	1971	31	5	1971	-9.9	-9.9	-9.9	-9.9	-9.9	2.5	2.5	2.5	.0
Ann	-9.9	-9.9	N/A	N/A	12.0	Nov 1976	30	17.1	Nov 1976	48	Apr 1984	27	23	Feb 1971	-9.9	-9.9	-9.9	-9.9	-9.9	-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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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	7/12	7/05	6/30	6/26	6/22	6/18	6/13	6/08	6/01
32	6/16	6/10	6/06	6/02	5/30	5/27	5/23	5/19	5/13
28	5/30	5/24	5/20	5/16	5/13	5/10	5/07	5/02	4/27
24	5/15	5/11	5/07	5/05	5/02	4/29	4/27	4/23	4/19
20	5/06	4/30	4/26	4/22	4/19	4/15	4/12	4/08	4/02
16	4/22	4/17	4/13	4/10	4/07	4/04	3/31	3/28	3/22

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	8/15	8/21	8/25	8/29	9/01	9/05	9/08	9/13	9/19
32	9/02	9/06	9/09	9/11	9/13	9/15	9/17	9/20	9/24
28	9/09	9/13	9/15	9/18	9/20	9/23	9/25	9/28	10/02
24	9/16	9/21	9/25	9/29	10/02	10/05	10/09	10/13	10/19
20	9/26	10/02	10/07	10/10	10/14	10/17	10/21	10/25	10/31
16	10/05	10/12	10/17	10/21	10/24	10/28	11/01	11/06	11/12

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	98	88	82	76	71	66	60	54	45
32	124	118	113	109	105	101	97	92	86
28	150	143	138	133	129	125	121	115	108
24	170	164	160	156	152	149	145	141	135
20	202	193	187	182	177	172	167	161	153
16	224	216	210	205	200	195	190	184	175

***** 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	1479	1164	1023	697	426	185	59	82	311	648	1082	1412	8568
60	1324	1024	868	547	283	100	18	32	196	493	932	1257	7074
57	1231	940	775	458	207	62	8	17	139	402	842	1164	6245
55	1169	884	713	401	162	42	3	10	107	342	782	1102	5717
50	1015	752	561	266	75	14	0	2	46	206	641	948	4526
32	511	322	138	15	0	0	0	0	0	7	219	447	1659

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	55	82	138	308	600	861	1105	1080	701	382	127	57	5496
55	0	0	0	4	49	214	395	377	118	4	0	0	1161
57	0	0	0	1	32	173	338	322	90	2	0	0	958
60	0	0	0	0	14	121	255	244	57	0	0	0	691
65	0	0	0	0	3	56	141	139	22	0	0	0	361
70	0	0	0	0	0	20	63	65	7	0	0	0	155

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	2	9	44	162	387	639	869	851	502	213	35	4	2	11	55	217	604	1243	2112	2963	3465	3678	3713	3717
45	0	1	10	85	250	490	714	696	362	116	12	0	0	1	11	96	346	836	1550	2246	2608	2724	2736	2736
50	0	0	1	38	138	345	559	541	240	51	0	0	0	0	1	39	177	522	1081	1622	1862	1913	1913	1913
55	0	0	0	11	63	211	405	389	136	14	0	0	0	0	0	11	74	285	690	1079	1215	1229	1229	1229
60	0	0	0	1	23	106	260	245	63	4	0	0	0	0	0	1	24	130	390	635	698	702	702	702
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	2	14	55	142	263	403	548	541	347	184	38	5	2	16	71	213	476	879	1427	1968	2315	2499	2537	2542

(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