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: BIG SANDY, MT **COOP ID: 240770**

Climate Division: MT 3 **NWS Call Sign:** **Elevation: 2,770 Feet** **Lat: 48˚08N** **Lon: 110˚04W**

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	30.1	4.5	17.3	76	1946	13	32.0	1992	-51	1969	25	-2.1	1979	1479	0	.0	.0	2.5	13.9	30.0	11.9
Feb	37.5	10.5	24.0	76	1992	27	36.8	1991	-52	1936	15	8.5	1979	1149	0	.0	.0	6.5	8.8	26.3	7.2
Mar	48.7	20.1	34.4	78	1999	25	43.1	1986	-44	1951	8	22.3	1996	949	0	.0	.0	16.5	3.8	27.3	1.9
Apr	61.0	29.2	45.1	101	1941	18	52.0	1987	-15	1936	2	33.3	1975	599	1	.0	.1	25.1	.6	16.5	@
May	70.8	38.6	54.7	106	1941	23	59.7	1988	9	1954	2	48.7	1996	328	9	.0	.7	30.0	.0	5.0	.0
Jun	79.2	45.5	62.4	106+	1936	27	71.9	1988	20	1923	15	58.5	1981	135	62	.2	3.9	30.0	.0	.4	.0
Jul	86.7	50.0	68.4	109+	1936	15	73.9	1998	34	1944	5	60.1	1993	60	163	1.0	11.4	31.0	.0	.0	.0
Aug	86.3	48.1	67.2	111	1961	5	74.5	1971	25	1992	25	61.6	1980	86	160	1.0	12.1	31.0	.0	.2	.0
Sep	74.7	38.1	56.4	106	1941	23	64.6	1998	12	1926	24	49.3	1985	287	29	.0	2.6	29.1	.0	4.5	.0
Oct	62.2	28.4	45.3	92	1942	4	48.3	1986	-19	1991	29	40.3	1991	611	0	.0	@	26.6	.5	16.1	.2
Nov	43.7	16.5	30.1	78+	1999	7	42.1	1999	-33	1985	27	12.2	1985	1047	0	.0	.0	10.8	5.9	26.7	3.2
Dec	33.5	7.5	20.5	75	1930	12	34.0	1999	-50	1983	24	-3.4	1983	1380	0	.0	.0	4.3	11.3	29.9	8.2
Ann	59.5	28.1	43.8	111	Aug 1961	5	74.5	Aug 1971	-52	Feb 1936	15	-3.4	Dec 1983	8110	424	2.2	30.8	243.4	44.8	182.9	32.6

\+ 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: 1921-2001

(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	.56	.40	.90	1942	4	1.91	1971	.00	1973
Feb	.34	.29	.99	1977	24	.99	1977	.00	1997
Mar	.60	.59	1.07	1932	29	1.66	1981	.00	1994
Apr	1.13	.78	3.32	1989	6	4.76	1989	.00	1977
May	2.46	1.96	5.91	1961	31	8.58	1974	.43	1988
Jun	2.58	2.18	3.68	1938	22	9.52	1995	.31	1985
Jul	1.64	1.47	2.83	1983	10	4.13	1983	.04	1984
Aug	1.35	1.07	3.20	1968	15	4.22	1974	.12	1988
Sep	1.38	.97	1.65	1929	24	4.96	1986	.18+	1994
Oct	.75	.73	1.46	1958	20	2.28	1981	.05	1974
Nov	.49	.38	1.15	1922	17	1.20	1976	.00+	2000
Dec	.54	.51	4.50	1933	11	2.48	1977	.00+	1999
Ann	13.82	13.20	5.91	May 1961	31	9.52	Jun 1995	.00+	Nov 2000

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	4.7	2.0	.1	.0
Feb	2.8	1.1	@	.0
Mar	5.3	2.0	.2	.0
Apr	5.8	3.0	.4	.1
May	9.9	5.6	1.4	.6
Jun	9.0	5.4	1.6	.5
Jul	7.8	4.2	.7	.2
Aug	6.6	3.6	.8	.1
Sep	6.3	3.5	.7	.2
Oct	4.1	2.1	.4	@
Nov	4.2	1.7	.1	.0
Dec	5.3	1.8	.1	.0
Ann	71.8	36.0	6.5	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	.04	.10	.18	.27	.35	.44	.55	.69	.87	1.16	1.44
Feb	.03	.06	.12	.17	.22	.28	.34	.42	.53	.70	.87
Mar	.04	.10	.19	.28	.38	.48	.60	.74	.94	1.27	1.58
Apr	.08	.19	.37	.54	.71	.90	1.12	1.39	1.76	2.35	2.93
May	.48	.70	1.06	1.39	1.73	2.09	2.50	3.00	3.65	4.70	5.70
Jun	.58	.82	1.20	1.54	1.88	2.24	2.64	3.12	3.76	4.77	5.73
Jul	.20	.33	.57	.79	1.04	1.30	1.62	2.00	2.52	3.38	4.22
Aug	.17	.28	.47	.66	.86	1.08	1.33	1.65	2.08	2.78	3.46
Sep	.16	.27	.46	.66	.86	1.09	1.36	1.69	2.13	2.87	3.59
Oct	.13	.19	.30	.40	.51	.62	.76	.91	1.13	1.47	1.80
Nov	.00	.00	.12	.20	.29	.38	.49	.62	.79	1.08	1.37
Dec	.00	.00	.13	.22	.32	.42	.54	.68	.87	1.19	1.50
Ann	8.04	9.07	10.44	11.51	12.48	13.44	14.44	15.57	16.96	19.02	20.85

+ 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: 1921-2001
(3) Derived from 1971-2000 serially complete daily data

Complete documentation available from:
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Snow (inches)

Snow Totals

Means/Medians (1)

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median
Jan	4.7	-99.9	2	0
Feb	3.0	-99.9	1	0
Mar	2.7	-99.9	#	0
Apr	#	#	#	0
May	.4	.0	0	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	#	.0	0	0
Oct	.9	.0	0	0
Nov	.8	-99.9	#	0
Dec	1.7	-99.9	1	#
Ann	14.2	-9.9	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	14.0	1984	16	14.0	1984	9	1992	15	6+	1989
Feb	6.0	1977	24	6.0	1977	6	1993	20	6	1993
Mar	8.0	1996	4	8.0	1996	2+	1995	5	#+	1995
Apr	#	1988	25	#+	1988	3	1992	10	#	1992
May	5.0	1982	29	5.0	1982	0	0	0	0	0
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	#	1983	29	#	1983	0	0	0	0	0
Oct	4.6	1991	27	7.3	1991	7	1991	31	1	1991
Nov	2.5	1984	25	2.5	1984	9	1976	29	2	1991
Dec	5.0	1995	10	5.0	1995	13	1983	27	9	1983
Ann	14.0	Jan 1984	16	14.0	Jan 1984	13	Dec 1983	27	9	Dec 1983

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	.9	.7	.3	.1	.1
Feb	-9.9	-9.9	-9.9	-9.9	-9.9
Mar	-9.9	-9.9	-9.9	-9.9	-9.9
Apr	.0	.0	.0	.0	.0
May	.1	.1	.1	.1	.0
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.0	.0	.0	.0	.0
Oct	.5	.5	.1	.0	.0
Nov	-9.9	-9.9	-9.9	-9.9	-9.9
Dec	-9.9	-9.9	-9.9	-9.9	-9.9
Ann	-9.9	-9.9	-9.9	-9.9	-9.9

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	-9.9	-9.9	-9.9	-9.9
Feb	-9.9	-9.9	-9.9	-9.9
Mar	-9.9	-9.9	-9.9	-9.9
Apr	.0	.0	.0	.0
May	.0	.0	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.0	.0	.0	.0
Oct	.0	.0	.0	.0
Nov	-9.9	-9.9	-9.9	-9.9
Dec	-9.9	-9.9	-9.9	-9.9
Ann	-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	6/21	6/16	6/11	6/08	6/04	6/01	5/28	5/24	5/18
32	6/09	6/03	5/29	5/25	5/22	5/18	5/14	5/09	5/03
28	5/24	5/18	5/14	5/11	5/07	5/04	5/01	4/26	4/21
24	5/07	5/02	4/29	4/26	4/23	4/20	4/17	4/14	4/09
20	5/04	4/27	4/22	4/18	4/14	4/10	4/05	3/31	3/25
16	4/17	4/12	4/08	4/04	4/01	3/29	3/25	3/21	3/16

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	9/02	9/05	9/08	9/12	9/16	9/21
32	9/01	9/06	9/09	9/12	9/15	9/18	9/21	9/25	9/30
28	9/09	9/14	9/17	9/20	9/23	9/26	9/29	10/03	10/08
24	9/19	9/24	9/27	9/30	10/03	10/05	10/08	10/11	10/16
20	9/30	10/06	10/10	10/14	10/18	10/21	10/25	10/29	11/04
16	10/15	10/20	10/24	10/27	10/30	11/01	11/05	11/08	11/13

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	116	108	102	97	92	87	82	76	68
32	145	135	128	122	116	110	104	97	88
28	162	154	148	143	138	133	129	123	115
24	185	177	171	166	162	157	152	147	139
20	216	205	198	192	186	180	174	167	157
16	232	225	219	215	211	207	202	197	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)

Base	Heating Degree Days (1)												
Below	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
65	1479	1149	949	599	328	135	60	86	287	611	1047	1380	8110
60	1328	1021	794	456	198	60	19	36	178	457	897	1225	6669
57	1241	942	702	375	136	30	9	20	124	366	812	1133	5890
55	1186	890	642	324	102	18	5	13	94	307	757	1082	5420
50	1040	762	499	213	42	3	0	3	39	179	616	935	4331
32	571	381	122	14	0	0	0	0	0	6	223	471	1788

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	115	156	196	407	704	917	1127	1097	732	418	166	114	6149
55	16	21	4	26	93	245	419	397	136	6	10	12	1385
57	9	18	1	18	65	197	361	342	106	2	5	1	1125
60	4	13	0	9	34	136	278	265	69	1	0	0	809
65	0	0	0	1	9	62	163	160	29	0	0	0	424
70	0	0	0	0	0	20	82	83	10	0	0	0	195

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	4	19	69	228	494	719	914	895	541	254	44	4	4	23	92	320	814	1533	2447	3342	3883	4137	4181	4185
45	0	2	22	132	341	569	759	741	397	144	15	0	0	2	24	156	497	1066	1825	2566	2963	3107	3122	3122
50	0	0	4	67	212	422	604	587	266	70	4	0	0	0	4	71	283	705	1309	1896	2162	2232	2236	2236
55	0	0	0	24	111	276	451	435	154	22	0	0	0	0	0	24	135	411	862	1297	1451	1473	1473	1473
60	0	0	0	11	48	158	305	285	71	3	0	0	0	0	0	11	59	217	522	807	878	881	881	881
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	2	25	74	187	330	460	583	565	372	213	45	8	2	27	101	288	618	1078	1661	2226	2598	2811	2856	2864

(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