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: AUGUSTA, MT **COOP ID: 240364**

Climate Division: MT 4 **NWS Call Sign:** **Elevation: 4,070 Feet** **Lat: 47˚30N** **Lon: 112˚24W**

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	35.5	11.7	23.6	66+	1996	12	36.3	1986	-51	1909	10	6.7	1979	1283	0	.0	.0	5.3	9.5	26.9	8.5
Feb	41.0	15.7	28.4	72	1992	27	39.7	1991	-48	1936	15	11.4	1989	1027	0	.0	.0	8.9	5.9	24.1	5.2
Mar	47.6	22.1	34.9	75+	1978	29	43.5	1986	-40	1951	8	26.8	1996	934	0	.0	.0	15.2	3.1	26.2	1.7
Apr	57.0	29.6	43.3	89+	1910	25	50.8	1987	-22	1935	2	31.2	1975	651	0	.0	.0	22.9	.7	19.0	.2
May	65.6	37.8	51.7	94	1919	28	55.6	1987	7	1954	2	46.4	1996	413	1	.0	@	29.3	.0	6.8	.0
Jun	73.8	45.3	59.6	102	1936	28	66.7	1988	14	1918	7	55.8	1976	192	28	.0	1.2	30.0	.0	.5	.0
Jul	81.2	49.0	65.1	102	1960	19	70.6	1985	30+	1918	4	57.5	1993	89	92	.1	5.7	31.0	.0	.0	.0
Aug	81.1	47.7	64.4	103+	1961	5	70.9	1971	17	1945	15	59.6	1993	111	92	.1	5.7	31.0	.0	.2	.0
Sep	71.4	39.5	55.5	96+	2001	1	62.3	1998	0	1926	24	48.2	1985	307	20	.0	1.2	28.6	.0	5.8	.0
Oct	60.7	31.5	46.1	94	1905	3	49.6	1974	-17	1991	30	40.3	1984	586	0	.0	.1	26.3	.8	16.3	.3
Nov	43.8	21.8	32.8	79	1962	3	41.9	1999	-39	1903	17	13.7	1985	967	0	.0	.0	10.7	4.2	23.4	2.7
Dec	36.7	14.1	25.4	67+	1980	16	36.3	1999	-48	1968	29	5.7	1983	1226	0	.0	.0	5.7	7.9	27.0	6.0
Ann	58.0	30.5	44.2	103+	Aug 1961	5	70.9	Aug 1971	-51	Jan 1909	10	5.7	Dec 1983	7786	233	.2	13.9	244.9	32.1	176.2	24.6

\+ 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: 1896-2001

(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	.51	.48	1.30	1913	3	.99	1971	.00	1995
Feb	.43	.37	.96	1917	25	1.22	1986	.01	1973
Mar	.65	.47	1.23	1961	27	1.63	1987	.05	1994
Apr	1.17	1.10	3.15	1951	30	3.26	1975	.00	1981
May	2.55	2.34	4.11	1897	30	5.92	1981	.27	1973
Jun	2.25	2.00	3.21	1964	8	6.31	1991	.40	1988
Jul	1.45	1.18	2.86	1913	26	4.30	1993	.01	1973
Aug	1.51	1.22	2.22	1933	21	4.40	1972	.07	2000
Sep	1.28	1.08	1.85	1982	27	4.26	1986	.04	1990
Oct	.85	.64	1.92	1914	5	4.16	1975	.00	1976
Nov	.54	.38	1.01	1927	4	1.48	1978	.03	1984
Dec	.56	.48	.70+	1996	29	1.79	1996	.00	1997
Ann	13.75	12.95	4.11	May 1897	30	6.31	Jun 1991	.00+	Dec 1997

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	6.3	1.7	.0	.0
Feb	4.6	1.5	.0	.0
Mar	6.1	2.5	@	.0
Apr	7.4	3.4	.5	.1
May	10.7	6.5	1.4	.5
Jun	9.8	5.0	1.2	.5
Jul	6.9	3.7	.7	.2
Aug	7.9	3.9	.7	.3
Sep	6.3	3.3	.7	.1
Oct	5.1	2.4	.3	.1
Nov	5.0	1.8	.1	.0
Dec	5.7	1.9	.2	.0
Ann	81.8	37.6	5.8	1.8

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	.06	.12	.20	.28	.35	.43	.52	.63	.77	1.00	1.22
Feb	.03	.06	.11	.17	.24	.31	.41	.52	.69	.96	1.23
Mar	.12	.17	.27	.36	.45	.54	.65	.79	.96	1.25	1.53
Apr	.08	.20	.38	.55	.73	.93	1.16	1.44	1.82	2.44	3.04
May	.65	.89	1.26	1.58	1.91	2.25	2.63	3.08	3.67	4.61	5.48
Jun	.37	.56	.89	1.20	1.52	1.86	2.26	2.75	3.40	4.45	5.45
Jul	.07	.15	.32	.51	.74	1.00	1.33	1.75	2.34	3.35	4.37
Aug	.18	.30	.51	.72	.94	1.19	1.48	1.84	2.33	3.13	3.91
Sep	.06	.13	.27	.44	.64	.87	1.16	1.54	2.07	2.97	3.89
Oct	.02	.07	.18	.30	.44	.59	.78	1.03	1.37	1.95	2.52
Nov	.04	.08	.15	.23	.31	.40	.51	.65	.85	1.17	1.49
Dec	.04	.10	.19	.27	.35	.45	.55	.69	.86	1.15	1.43
Ann	7.68	8.75	10.17	11.29	12.31	13.31	14.37	15.57	17.05	19.25	21.20

+ 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: 1896-2001
(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	2.5	-99.9	2	1
Feb	2.5	-99.9	1	#
Mar	1.5	-99.9	1	#
Apr	.8	-99.9	#	0
May	#	.0	0	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.7	.0	#	0
Oct	.4	.0	#	0
Nov	1.0	-99.9	#	#
Dec	3.7	-99.9	1	#
Ann	13.1	-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	5.0	1971	17	5.0	1971	12	1971	14	12	1971
Feb	10.0	1986	15	10.0	1986	13	1975	11	6	1979
Mar	3.0	1971	22	3.0	1971	12	1982	19	2+	1985
Apr	4.0	1985	19	4.0+	1985	12	1975	9	2	1975
May	#	1978	5	#	1978	12	1983	10	1	1983
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	4.0	1983	19	7.0	1983	2	1973	15	#	1973
Oct	3.0	1985	6	3.0	1985	4+	1984	27	#+	1984
Nov	4.0	1976	25	4.0	1976	10	1978	20	5	1978
Dec	7.0	1979	15	11.0	1979	18	1977	23	7	1978
Ann	10.0	Feb 1986	15	11.0	Dec 1979	18	Dec 1977	23	12	Jan 1971

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	-9.9	-9.9	-9.9	-9.9	-9.9
Feb	-9.9	-9.9	-9.9	-9.9	-9.9
Mar	-9.9	-9.9	-9.9	-9.9	-9.9
Apr	-9.9	-9.9	-9.9	-9.9	-9.9
May	.0	.0	.0	.0	.0
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.2	.2	.2	.0	.0
Oct	.2	.2	.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	.0	.0	.0	.0
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
Oct	@	.0	.0	.0
Nov	.6	.2	.0	.0
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	7/06	6/29	6/24	6/20	6/16	6/12	6/07	6/02	5/26
32	6/09	6/05	6/01	5/29	5/27	5/24	5/21	5/17	5/13
28	5/21	5/17	5/14	5/11	5/08	5/05	5/03	4/29	4/25
24	5/12	5/07	5/04	5/01	4/28	4/26	4/23	4/19	4/14
20	5/05	4/29	4/24	4/21	4/17	4/14	4/10	4/06	3/31
16	4/24	4/18	4/14	4/10	4/06	4/03	3/30	3/26	3/20

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	8/11	8/17	8/22	8/25	8/29	9/01	9/05	9/10	9/16
32	9/02	9/06	9/08	9/10	9/12	9/14	9/16	9/18	9/22
28	9/08	9/12	9/15	9/17	9/19	9/22	9/24	9/27	10/01
24	9/14	9/20	9/23	9/26	9/29	10/02	10/05	10/09	10/14
20	9/24	9/29	10/03	10/06	10/09	10/12	10/15	10/19	10/24
16	10/02	10/08	10/13	10/16	10/20	10/24	10/27	11/01	11/07

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	99	90	84	79	73	68	63	57	48
32	123	118	114	111	108	105	102	98	93
28	153	146	141	137	134	130	126	121	114
24	175	168	162	158	153	149	144	139	131
20	198	189	183	178	174	169	164	158	150
16	222	213	206	201	196	191	185	179	170

***** 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	1283	1027	934	651	413	192	89	111	307	586	967	1226	7786
60	1129	887	779	505	267	96	29	46	192	431	817	1071	6249
57	1047	811	686	420	189	54	13	23	136	340	735	990	5444
55	987	758	624	365	144	34	7	15	104	282	678	931	4929
50	842	629	477	242	62	8	0	3	44	155	540	786	3788
32	399	255	89	16	0	0	0	0	0	4	173	354	1290

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	139	152	178	355	610	826	1026	1004	703	441	196	151	5781
55	14	12	0	14	42	169	320	306	117	6	11	14	1025
57	12	8	0	9	24	130	264	253	89	2	8	11	810
60	1	0	0	3	9	81	187	182	55	1	0	0	519
65	0	0	0	0	1	28	92	92	20	0	0	0	233
70	0	0	0	0	0	6	30	33	6	0	0	0	75

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	24	35	60	170	384	602	799	779	489	256	61	27	24	59	119	289	673	1275	2074	2853	3342	3598	3659	3686
45	4	6	24	88	245	452	644	624	349	150	24	2	4	10	34	122	367	819	1463	2087	2436	2586	2610	2612
50	0	1	2	38	134	305	490	469	223	73	8	0	0	1	3	41	175	480	970	1439	1662	1735	1743	1743
55	0	0	0	7	57	178	337	318	118	28	0	0	0	0	0	7	64	242	579	897	1015	1043	1043	1043
60	0	0	0	0	18	83	194	181	51	7	0	0	0	0	0	0	18	101	295	476	527	534	534	534
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	12	29	60	148	263	382	509	502	341	204	42	10	12	41	101	249	512	894	1403	1905	2246	2450	2492	2502

(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

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