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: WESTERN AG RESEARCH CNTR, MT **COOP ID: 248783**

Climate Division: MT 1 **NWS Call Sign:** **Elevation: 3,597 Feet** **Lat: 46˚19N** **Lon: 114˚07W**

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	35.2	17.6	26.4	63	1989	30	36.5	1994	-26+	1979	6	8.2	1979	1197	0	.0	.0	3.1	10.2	27.7	4.2
Feb	42.2	20.8	31.5	70+	1995	24	38.5	1991	-30	1989	4	17.5	1989	938	0	.0	.0	6.5	4.8	25.1	2.0
Mar	51.2	26.6	38.9	78	1978	29	44.5	1992	-11	1989	4	33.7	1976	809	0	.0	.0	17.4	.8	24.8	.2
Apr	60.5	31.8	46.2	88	1987	29	51.6	1987	9	1977	2	39.5	1975	566	0	.0	.0	25.8	.0	16.7	.0
May	68.5	38.5	53.5	95	1986	31	58.3	1993	17	1972	1	49.0	1975	359	2	.0	.3	30.5	.0	5.6	.0
Jun	76.5	44.8	60.7	97	1974	20	66.1	1986	29	1984	1	56.7	1975	162	31	.0	2.3	30.0	.0	.5	.0
Jul	84.4	48.7	66.6	102	1973	10	72.0	1985	31	1971	7	59.8	1993	62	110	.1	7.9	31.0	.0	@	.0
Aug	83.9	47.6	65.8	101	1998	6	69.6	1991	27	1992	25	61.6	1980	70	93	@	6.9	31.0	.0	.1	.0
Sep	72.7	40.1	56.4	96	1967	1	62.9	1998	18+	2000	22	51.0	1971	275	17	.0	.5	29.7	.0	4.1	.0
Oct	60.4	32.0	46.2	86	2001	1	52.7	1988	0	1971	29	42.7	1971	583	0	.0	.0	26.3	.2	16.2	@
Nov	43.5	24.1	33.8	76	1999	12	41.4	1999	-14	1993	25	24.4	1985	936	0	.0	.0	7.8	4.0	24.5	.8
Dec	34.6	17.2	25.9	63	1975	9	34.4	1980	-32	1983	23	12.4	1983	1213	0	.0	.0	2.5	11.7	28.0	2.7
Ann	59.5	32.5	46.0	102	Jul 1973	10	72.0	Jul 1985	-32	Dec 1983	23	8.2	Jan 1979	7170	253	.1	17.9	241.6	31.7	173.3	9.9

\+ 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/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 1 **NWS Call Sign:** **Elevation: 3,597 Feet** **Lat: 46°19N** **Lon: 114°07W**

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	.71	.62	.75	1982	15	1.50	1996	.16+	1992
Feb	.54	.42	.51	1972	29	1.65	1972	.08+	1991
Mar	.68	.59	.59	1973	22	2.29	1989	.21	1979
Apr	.99	.83	1.20	1996	10	2.53	1996	.20	1974
May	1.72	1.41	1.89	1969	20	5.24	1980	.31	1999
Jun	1.62	1.47	1.14	1995	5	3.99	1998	.23	2000
Jul	.94	.87	1.12	1983	10	2.44	1983	.01	1971
Aug	1.14	1.15	1.47	1974	20	3.02	1985	.00	1988
Sep	1.03	1.05	.81	1972	12	2.74	1985	.01	1979
Oct	.77	.56	1.20	1975	7	3.43	1975	.00	1987
Nov	.80	.63	.98	1996	19	2.35	1998	.19	1979
Dec	.75	.61	1.13	1996	26	3.84	1996	.00	1976
Ann	11.69	11.20	1.89	May 1969	20	5.24	May 1980	.00+	Aug 1988

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	8.2	2.3	.2	.0
Feb	7.2	1.8	@	.0
Mar	8.6	2.1	.1	.0
Apr	8.9	3.1	.4	@
May	10.7	5.0	.7	.1
Jun	10.2	5.0	.6	.1
Jul	6.8	2.9	.2	@
Aug	7.4	3.4	.5	.1
Sep	6.8	3.1	.3	.0
Oct	6.9	2.3	.3	.1
Nov	9.3	2.7	.1	.0
Dec	8.5	2.4	.1	@
Ann	99.5	36.1	3.5	.4

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	.13	.19	.30	.39	.49	.60	.72	.87	1.07	1.38	1.68
Feb	.07	.11	.18	.26	.34	.43	.53	.66	.83	1.11	1.38
Mar	.19	.26	.35	.44	.52	.61	.71	.82	.97	1.20	1.42
Apr	.19	.28	.43	.56	.69	.84	1.00	1.20	1.47	1.89	2.29
May	.45	.61	.86	1.08	1.30	1.52	1.78	2.08	2.47	3.09	3.67
Jun	.39	.54	.78	.99	1.20	1.42	1.67	1.96	2.34	2.95	3.52
Jul	.08	.14	.27	.40	.54	.70	.90	1.14	1.47	2.04	2.59
Aug	.08	.20	.38	.55	.73	.92	1.14	1.41	1.77	2.36	2.94
Sep	.08	.15	.28	.42	.58	.76	.97	1.25	1.62	2.26	2.88
Oct	.05	.13	.25	.36	.48	.61	.76	.95	1.20	1.60	2.00
Nov	.21	.28	.40	.50	.60	.71	.83	.97	1.15	1.43	1.70
Dec	.05	.13	.24	.35	.47	.60	.74	.92	1.17	1.57	1.95
Ann	7.03	7.87	8.98	9.84	10.63	11.39	12.20	13.10	14.21	15.84	17.28

\+ 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 1 **NWS Call Sign:** **Elevation: 3,597 Feet** **Lat: 46˚19N** **Lon: 114˚07W**

Snow (inches)

Snow Totals

Means/Medians (1)

Extremes (2)

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
Jan	2.3	-99.9	1	1	4.5	2000	11	4.5	2000	5+	2000	11	2+	1998
Feb	2.3	-99.9	1	0	6.8	1999	9	6.8	1999	8	1999	10	3	1999
Mar	.7	-99.9	#	0	2.2	1998	5	2.2	1998	#+	1999	11	#+	1999
Apr	.3	.0	0	0	1.5	1997	23	1.5	1997	0	0	0	0	0
May	.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
Jul	.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
Sep	#	.0	0	0	#	1985	27	#	1985	0	0	0	0	0
Oct	.0	.0	#	0	.0	0	0	.0	0	#	1991	29	#	1991
Nov	.0	-99.9	#	0	.1	1972	27	.1	1972	3	1998	17	#+	1999
Dec	2.8	-99.9	#	#	8.5	1992	29	8.5	1992	3	1998	23	1	1998
Ann	8.4	-9.9	N/A	N/A	8.5	Dec 1992	29	8.5	Dec 1992	8	Feb 1999	10	3	Feb 1999

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	.0	.0	.0	.0	.0
Oct	-9.9	-9.9	-9.9	-9.9	-9.9
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	7/08	7/02	6/28	6/24	6/20	6/17	6/13	6/09	6/03
32	6/15	6/09	6/05	6/02	5/29	5/26	5/23	5/18	5/13
28	5/25	5/20	5/17	5/13	5/11	5/08	5/05	5/01	4/26
24	5/12	5/06	5/03	4/29	4/26	4/23	4/20	4/16	4/10
20	4/30	4/23	4/17	4/13	4/08	4/04	3/30	3/25	3/17
16	4/11	4/03	3/28	3/23	3/18	3/13	3/08	3/02	2/22

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	8/23	8/27	8/31	9/02	9/05	9/08	9/11	9/14	9/19
32	9/02	9/07	9/11	9/13	9/16	9/19	9/22	9/25	9/30
28	9/10	9/15	9/19	9/22	9/25	9/28	10/01	10/05	10/10
24	9/23	9/28	10/02	10/05	10/08	10/11	10/14	10/17	10/22
20	10/01	10/08	10/13	10/17	10/20	10/24	10/28	11/02	11/09
16	10/24	10/29	11/01	11/04	11/07	11/10	11/13	11/16	11/21

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	90	85	80	76	72	67	62	54
32	129	122	117	113	109	105	101	96	89
28	161	153	147	141	137	132	127	121	112
24	188	180	174	169	164	159	154	148	140
20	222	213	206	200	195	189	183	176	167
16	263	253	245	239	234	228	222	214	204

***** 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	1197	938	809	566	359	162	62	70	275	583	936	1213	7170
60	1042	798	654	418	218	73	16	20	160	428	786	1058	5671
57	949	714	561	332	148	37	6	7	106	337	696	965	4858
55	887	658	499	278	109	21	2	4	77	277	636	903	4351
50	741	526	351	160	40	4	0	0	26	147	495	748	3238
32	283	147	27	1	0	0	0	0	0	1	112	274	845

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	110	132	241	425	666	859	1071	1046	732	441	166	84	5973
55	0	0	0	12	63	190	360	337	118	4	0	0	1084
57	0	0	0	6	39	146	302	279	87	2	0	0	861
60	0	0	0	2	17	92	219	199	52	0	0	0	581
65	0	0	0	0	2	31	110	93	17	0	0	0	253
70	0	0	0	0	0	7	39	29	4	0	0	0	79

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	10	22	71	207	420	622	823	804	496	227	38	10	10	32	103	310	730	1352	2175	2979	3475	3702	3740	3750
45	0	3	22	107	275	472	668	649	355	115	12	0	0	3	25	132	407	879	1547	2196	2551	2666	2678	2678
50	0	0	2	47	154	323	513	494	223	48	1	0	0	0	2	49	203	526	1039	1533	1756	1804	1805	1805
55	0	0	0	14	66	190	360	341	114	13	0	0	0	0	0	14	80	270	630	971	1085	1098	1098	1098
60	0	0	0	0	23	93	215	196	44	1	0	0	0	0	0	0	23	116	331	527	571	572	572	572
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	1	15	69	167	289	399	528	516	348	179	26	1	1	16	85	252	541	940	1468	1984	2332	2511	2537	2538

(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