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: MISSOULA 2 NE, MT **COOP ID: 245735**

Climate Division: MT 1 **NWS Call Sign:** **Elevation: 3,420 Feet** **Lat: 46˚54N** **Lon: 113˚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	32.5	16.8	24.7	58	1989	30	34.1	1994	-27	1979	1	7.4	1979	1250	0	.0	.0	.5	12.4	28.6	3.9
Feb	39.3	20.9	30.1	65	1995	24	36.9	1992	-23	1989	3	16.7	1989	977	0	.0	.0	2.7	5.8	25.6	1.6
Mar	48.1	27.0	37.6	75	1978	29	44.0	1992	-4	1976	2	32.7	1976	851	0	.0	.0	12.4	1.2	24.2	.1
Apr	57.1	32.7	44.9	87+	1987	28	51.0	1987	16+	1982	8	38.5	1975	604	0	.0	.0	22.2	@	14.0	.0
May	65.3	39.6	52.5	93	1986	30	59.0	1993	21+	1985	12	47.8	1974	392	3	.0	.2	29.2	.0	4.3	.0
Jun	73.4	45.9	59.7	97	1974	19	65.4	1986	30	1984	1	55.2	1981	191	30	.0	1.6	30.0	.0	.2	.0
Jul	82.3	50.5	66.4	104	1973	10	73.3	1985	30	1971	7	58.2	1993	84	127	.2	7.1	31.0	.0	@	.0
Aug	82.2	49.9	66.1	102	1969	24	70.1	1994	31+	1992	25	60.0	1980	81	113	.0	7.5	30.9	.0	.1	.0
Sep	71.2	41.7	56.5	97+	1988	3	63.7	1990	21	1970	14	50.8	1985	282	25	.0	.8	29.1	.0	2.7	.0
Oct	57.4	32.6	45.0	84	2001	1	52.0	1988	2	1971	29	41.6	1985	620	0	.0	.0	23.3	.3	13.9	.0
Nov	40.5	24.5	32.5	73	1999	12	39.9	1999	-10	1985	23	21.9	1985	976	0	.0	.0	4.6	4.9	24.4	.6
Dec	32.1	17.0	24.6	61+	1980	15	32.6	1980	-30	1983	23	12.9	1983	1254	0	.0	.0	.5	14.9	29.0	2.3
Ann	56.8	33.3	45.1	104	Jul 1973	10	73.3	Jul 1985	-30	Dec 1983	23	7.4	Jan 1979	7562	298	.2	17.2	216.4	39.5	167.0	8.5

\+ 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: 1966-2001

(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	1.35	1.17	.95	1982	23	2.72	1982	.29	1985
Feb	1.05	.88	1.08	1975	7	2.70	1986	.18+	1977
Mar	1.21	.99	1.00	1972	18	2.57	1972	.44	1986
Apr	1.43	1.25	1.12	1994	22	3.46	1994	.26	1977
May	2.38	2.06	1.98	1980	25	7.51	1980	.73	1974
Jun	2.10	2.04	2.15	1974	20	4.43	1998	.46	1977
Jul	1.28	1.05	1.30	1983	10	3.86	1983	.06	1985
Aug	1.23	.98	1.35	1968	15	3.96	1985	.10	1994
Sep	1.30	1.13	1.12+	1985	12	4.28	1985	.05	1979
Oct	1.08	.89	1.40	2000	1	4.15	1975	.03	1987
Nov	1.20	1.18	.72	1980	7	2.74	1998	.30	1976
Dec	1.43	1.24	.70	1996	29	4.90	1996	.25	1976
Ann	17.04	16.37	2.15	Jun 1974	20	7.51	May 1980	.03	Oct 1987

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	14.2	4.9	.2	.0
Feb	11.5	3.5	.2	@
Mar	12.6	3.8	.3	@
Apr	11.3	4.4	.4	.1
May	12.8	6.4	1.2	.3
Jun	12.7	5.6	1.0	.2
Jul	8.5	4.0	.4	.1
Aug	8.3	3.7	.6	.0
Sep	8.1	3.9	.5	.1
Oct	9.0	3.3	.3	.1
Nov	12.6	4.3	.2	.0
Dec	13.9	5.0	.2	.0
Ann	135.5	52.8	5.5	.9

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	.38	.50	.70	.87	1.03	1.21	1.40	1.63	1.92	2.39	2.82
Feb	.23	.32	.48	.62	.75	.90	1.07	1.27	1.53	1.95	2.35
Mar	.40	.51	.68	.82	.96	1.10	1.26	1.44	1.67	2.03	2.37
Apr	.42	.56	.76	.94	1.11	1.29	1.49	1.72	2.02	2.49	2.93
May	.66	.89	1.23	1.53	1.82	2.13	2.47	2.87	3.39	4.20	4.97
Jun	.57	.77	1.07	1.34	1.60	1.87	2.17	2.53	3.00	3.74	4.42
Jul	.16	.26	.45	.62	.81	1.02	1.26	1.56	1.97	2.63	3.27
Aug	.21	.32	.50	.67	.84	1.03	1.24	1.50	1.85	2.41	2.95
Sep	.16	.26	.45	.63	.82	1.03	1.28	1.59	2.01	2.69	3.36
Oct	.13	.22	.37	.52	.68	.86	1.06	1.31	1.66	2.22	2.77
Nov	.31	.43	.60	.75	.90	1.06	1.24	1.44	1.71	2.14	2.54
Dec	.32	.45	.66	.85	1.04	1.24	1.46	1.73	2.08	2.64	3.17
Ann	11.65	12.68	14.00	15.01	15.91	16.78	17.69	18.69	19.92	21.70	23.24

+ 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: 1966-2001
(3) Derived from 1971-2000 serially complete daily data

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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	13.6	12.1	5	5
Feb	9.2	8.8	4	2
Mar	7.6	6.3	1	#
Apr	1.9	1.0	#	#
May	.4	#	#	0
Jun	#	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.0	.0	#	0
Oct	1.2	.2	#	0
Nov	7.9	6.3	1	#
Dec	13.0	10.5	3	2
Ann	54.8	45.2	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	11.5	1982	23	33.9	1982	21	1982	23	14	1979
Feb	13.5	1975	7	22.3	1986	22	1979	3	13	1979
Mar	8.0	1977	19	20.8	1997	15	1997	12	9	1997
Apr	4.1	1989	17	9.5	1982	2	1982	6	#+	2000
May	5.0	1978	23	5.5	1978	4	1978	23	#+	1986
Jun	#	1999	8	#+	1999	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	1972	25	.5	1972	#	1999	27	#	1999
Oct	6.5	1975	21	8.3	1975	5	1973	31	#+	1999
Nov	7.0	1991	27	17.8	1971	9	1996	19	3	1996
Dec	12.6	1996	25	58.5	1996	25	1996	29	10	1996
Ann	13.5	Feb 1975	7	58.5	Dec 1996	25	Dec 1996	29	14	Jan 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	11.4	4.8	1.0	.4	@
Feb	8.3	3.1	.8	.4	@
Mar	6.9	2.4	.7	.3	.0
Apr	2.8	.8	.1	.0	.0
May	.4	.1	@	@	.0
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.1	.0	.0	.0	.0
Oct	1.2	.3	.1	@	.0
Nov	7.1	2.8	.7	.2	.0
Dec	10.9	4.5	1.0	.3	@
Ann	49.1	18.8	4.4	1.6	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	24.5	20.3	12.0	2.4
Feb	16.8	11.2	7.8	3.2
Mar	5.1	2.7	1.5	.2
Apr	.2	.0	.0	.0
May	@	@	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.0	.0	.0	.0
Oct	.4	.1	@	.0
Nov	7.4	2.0	1.0	.0
Dec	21.5	11.2	5.0	.5
Ann	75.9	47.5	27.3	6.3

+ 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	7/01	6/23	6/18	6/14	6/09	6/05	5/31	5/26	5/19
32	6/09	6/03	5/30	5/26	5/23	5/19	5/16	5/11	5/05
28	5/19	5/14	5/10	5/06	5/03	4/30	4/27	4/23	4/17
24	5/01	4/25	4/20	4/17	4/13	4/09	4/06	4/01	3/26
20	4/16	4/08	4/02	3/28	3/23	3/19	3/14	3/08	2/28
16	3/31	3/23	3/17	3/12	3/07	3/02	2/25	2/20	2/12

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	8/30	9/03	9/06	9/09	9/12	9/14	9/17	9/20	9/25
32	9/06	9/11	9/14	9/17	9/20	9/23	9/26	9/30	10/05
28	9/15	9/21	9/25	9/29	10/02	10/05	10/09	10/13	10/19
24	9/30	10/06	10/10	10/14	10/17	10/20	10/24	10/28	11/03
20	10/18	10/24	10/28	10/31	11/04	11/07	11/11	11/15	11/21
16	10/29	11/05	11/09	11/13	11/17	11/20	11/24	11/29	12/05

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	117	109	103	98	94	89	84	78	70
32	143	135	129	124	120	115	110	104	96
28	178	169	162	156	151	146	140	134	124
24	212	203	197	191	186	181	176	169	160
20	256	245	238	231	225	219	212	204	193
16	286	275	267	260	254	248	241	233	222

***** 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	1250	977	851	604	392	191	84	81	282	620	976	1254	7562
60	1095	837	696	454	251	95	30	28	172	465	826	1099	6048
57	1002	753	603	367	178	54	14	13	119	374	736	1006	5219
55	940	697	541	311	137	34	9	7	89	314	676	944	4699
50	788	557	390	185	60	8	0	1	36	180	529	789	3523
32	310	158	37	2	0	0	0	0	0	2	122	289	920

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	82	105	209	389	634	829	1066	1055	733	406	136	58	5702
55	0	0	0	7	58	173	362	348	132	5	0	0	1085
57	0	0	0	4	37	133	305	293	101	2	0	0	875
60	0	0	0	1	17	84	228	215	65	1	0	0	611
65	0	0	0	0	3	30	127	113	25	0	0	0	298
70	0	0	0	0	0	7	55	44	8	0	0	0	114

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	1	6	52	181	393	596	827	818	501	190	22	0	1	7	59	240	633	1229	2056	2874	3375	3565	3587	3587
45	0	0	14	87	250	446	672	663	355	92	8	0	0	0	14	101	351	797	1469	2132	2487	2579	2587	2587
50	0	0	0	39	138	302	518	509	227	32	0	0	0	0	0	39	177	479	997	1506	1733	1765	1765	1765
55	0	0	0	12	64	179	367	357	124	8	0	0	0	0	0	12	76	255	622	979	1103	1111	1111	1111
60	0	0	0	0	22	88	227	218	54	0	0	0	0	0	0	0	22	110	337	555	609	609	609	609
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	5	47	126	244	367	518	512	322	135	11	0	0	5	52	178	422	789	1307	1819	2141	2276	2287	2287

(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