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: WYOLA 1 SW, MT **COOP ID: 249175**

Climate Division: MT 5 **NWS Call Sign:** **Elevation: 3,730 Feet** **Lat: 45˚07N** **Lon: 107˚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	35.6	7.7	21.7	69+	1974	16	32.2	1986	-42	1997	12	3.5	1979	1343	0	.0	.0	4.8	10.7	30.2	9.0
Feb	41.4	13.0	27.2	74	1995	24	37.0	1992	-36+	1996	2	12.7	1989	1059	0	.0	.0	8.6	6.2	27.4	5.1
Mar	50.3	21.2	35.8	80	1978	30	43.3	1986	-25+	1989	4	29.5	1996	907	0	.0	.0	17.0	2.1	28.3	1.6
Apr	60.6	29.4	45.0	91	2001	27	50.5	1987	-4	1997	12	37.9	1975	600	0	.0	.0	24.5	.4	19.5	@
May	69.6	37.5	53.6	95+	1969	27	57.5	1994	15	1954	3	48.3	1995	358	3	.0	.2	29.8	.0	7.4	.0
Jun	78.8	45.4	62.1	101+	1988	26	70.3	1988	26	1951	3	56.6	1998	140	53	.1	3.6	29.9	.0	.6	.0
Jul	86.4	49.4	67.9	106	1959	24	72.5	1998	33+	1987	12	61.2	1993	53	142	.8	11.7	31.0	.0	.0	.0
Aug	86.2	47.8	67.0	108	1949	6	73.8	1971	27	1992	30	61.8	1987	79	140	.4	11.3	31.0	.0	.4	.0
Sep	74.9	38.3	56.6	102	1950	4	64.6	1998	15+	1985	30	51.2	1985	275	23	.0	2.4	29.1	.0	6.0	.0
Oct	62.7	29.6	46.2	93	1963	4	50.2	1973	-18	1991	30	41.0	1984	584	0	.0	.1	26.8	.4	20.0	.2
Nov	45.8	18.3	32.1	79	1975	5	42.8	1999	-37	1959	16	16.0	1985	989	0	.0	.0	11.7	4.2	28.0	2.2
Dec	37.4	9.8	23.6	71	1973	1	31.6	1999	-46	1983	24	5.1	1983	1283	0	.0	.0	5.5	9.3	30.3	7.0
Ann	60.8	29.0	44.9	108	Aug 1949	6	73.8	Aug 1971	-46	Dec 1983	24	3.5	Jan 1979	7670	361	1.3	29.3	249.7	33.3	198.1	25.1

\+ 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: 1948-2001

(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	.75	.70	1.24	1972	2	2.21	1972	.12	1992
Feb	.66	.58	.67	1991	18	1.80	1971	.02	1983
Mar	1.11	1.05	.79	1973	14	2.36	1984	.23	1999
Apr	2.06	1.97	2.24	2001	9	4.43	1973	.12	1981
May	2.69	2.40	2.40	1978	18	8.65	1978	.02	1998
Jun	2.36	1.91	3.19	1982	14	7.34	1982	.32	1987
Jul	1.51	1.14	2.10	1979	4	6.36	1993	.06	1999
Aug	.83	.61	2.02	1964	29	2.71	1998	.17	1999
Sep	1.58	1.22	1.18	1978	18	3.87	1973	.21	1975
Oct	1.64	1.43	1.87	1974	31	4.80	1994	.30	1987
Nov	.96	.92	1.12	1991	14	2.59	1991	.04	1997
Dec	.74	.64	.66	1989	15	2.04	1982	.11	1994
Ann	16.89	16.85	3.19	Jun 1982	14	8.65	May 1978	.02+	May 1998

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	6.2	2.7	.1	@
Feb	5.7	2.5	.1	.0
Mar	7.9	3.9	.3	.0
Apr	9.7	5.6	1.1	.2
May	10.6	6.1	1.6	.4
Jun	9.9	5.4	1.4	.3
Jul	7.1	3.8	.8	.3
Aug	5.6	2.2	.3	.1
Sep	7.4	4.2	.9	.1
Oct	7.3	4.4	.9	.1
Nov	6.1	3.1	.3	@
Dec	6.4	2.7	.2	.0
Ann	89.9	46.6	8.0	1.5

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	.18	.25	.36	.45	.55	.66	.77	.91	1.09	1.38	1.66
Feb	.09	.14	.24	.33	.43	.53	.66	.81	1.02	1.35	1.68
Mar	.33	.44	.60	.73	.87	1.01	1.16	1.34	1.57	1.93	2.26
Apr	.42	.60	.91	1.18	1.46	1.76	2.10	2.51	3.05	3.92	4.73
May	.43	.66	1.05	1.42	1.80	2.22	2.70	3.28	4.06	5.32	6.53
Jun	.48	.70	1.04	1.36	1.68	2.02	2.40	2.87	3.48	4.46	5.39
Jul	.10	.19	.38	.58	.82	1.09	1.41	1.83	2.41	3.40	4.38
Aug	.12	.19	.31	.43	.55	.68	.83	1.02	1.27	1.67	2.06
Sep	.32	.46	.70	.91	1.12	1.35	1.61	1.92	2.34	3.00	3.62
Oct	.39	.54	.78	.99	1.21	1.43	1.68	1.98	2.38	3.00	3.58
Nov	.23	.32	.46	.59	.71	.84	.99	1.16	1.39	1.75	2.09
Dec	.15	.22	.33	.43	.53	.64	.76	.90	1.09	1.39	1.68
Ann	11.90	12.87	14.10	15.04	15.88	16.69	17.52	18.45	19.57	21.20	22.61

+ 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: 1948-2001
(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	13.1	13.1	3	3
Feb	10.2	8.8	4	#
Mar	13.1	11.6	1	0
Apr	10.9	6.8	#	0
May	1.6	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	1.7	.0	#	0
Oct	3.9	2.0	#	0
Nov	9.3	7.3	1	#
Dec	11.7	12.3	1	0
Ann	75.5	61.9	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	13.0	1985	15	32.0	1972	21	1972	5	13	1972
Feb	12.0	1986	4	29.5	1971	24	1985	9	24	1985
Mar	12.0	1973	14	34.5	1973	10	1971	2	4	1987
Apr	20.0	1973	20	54.5	1973	20	1973	20	2	1975
May	10.0	1983	11	14.0	1983	6	1988	1	#+	1988
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	7.0	1983	19	8.0	1984	3	1985	28	#+	1985
Oct	10.0	1971	27	23.5	1971	8	1971	28	1	1971
Nov	14.0	1984	26	22.6	1975	16	1975	29	4	1985
Dec	24.0	1989	14	24.0	1989	11	1972	30	5	1971
Ann	24.0	Dec 1989	14	54.5	Apr 1973	24	Feb 1985	9	24	Feb 1985

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	5.6	3.7	1.7	.6	.2
Feb	4.1	3.2	1.3	.5	.1
Mar	4.7	3.3	1.9	.6	.1
Apr	2.2	1.8	1.2	.7	.2
May	.3	.3	.2	.1	.1
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.6	.5	.3	.1	.0
Oct	1.4	1.3	.6	.2	.1
Nov	3.0	2.6	1.0	.5	.1
Dec	4.6	3.6	1.5	.7	.2
Ann	26.5	20.3	9.7	4.0	1.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	-9.9	-9.9	-9.9	-9.9
Feb	7.0	5.2	3.4	1.9
Mar	3.7	1.7	.6	.1
Apr	1.1	.8	.6	.1
May	.1	.1	.1	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.2	@	.0	.0
Oct	.6	.2	.2	.0
Nov	3.5	2.6	1.7	.5
Dec	12.9	9.0	5.2	.4
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	7/20	7/10	7/03	6/27	6/22	6/16	6/11	6/04	5/25
32	6/11	6/06	6/02	5/30	5/28	5/25	5/22	5/18	5/14
28	5/26	5/21	5/17	5/14	5/11	5/08	5/05	5/01	4/26
24	5/15	5/09	5/05	5/01	4/28	4/25	4/21	4/17	4/11
20	5/01	4/25	4/22	4/18	4/15	4/12	4/09	4/05	3/31
16	4/23	4/16	4/12	4/08	4/04	4/01	3/28	3/24	3/17

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	8/14	8/20	8/24	8/28	8/31	9/04	9/08	9/12	9/18
32	8/21	8/27	9/01	9/05	9/09	9/13	9/17	9/22	9/29
28	9/07	9/12	9/15	9/17	9/20	9/22	9/25	9/28	10/03
24	9/15	9/20	9/24	9/27	9/30	10/03	10/06	10/10	10/15
20	9/28	10/03	10/07	10/11	10/14	10/17	10/20	10/24	10/29
16	10/08	10/14	10/17	10/21	10/24	10/27	10/30	11/03	11/08

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	107	94	85	77	70	62	54	45	32
32	130	121	115	109	104	99	93	87	78
28	151	144	139	135	132	128	124	119	112
24	180	171	165	160	155	149	144	138	129
20	206	198	191	186	181	176	170	164	155
16	226	217	211	206	202	197	192	186	177

***** 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	1343	1059	907	600	358	140	53	79	275	584	989	1283	7670
60	1188	919	752	453	221	62	14	30	163	430	839	1128	6199
57	1095	835	659	368	152	32	6	15	108	338	749	1035	5392
55	1033	784	597	314	113	19	1	8	78	277	696	973	4893
50	883	653	449	195	45	3	0	1	27	146	556	825	3783
32	398	260	74	6	0	0	0	0	0	3	174	352	1267

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	78	126	190	396	668	903	1112	1085	738	441	175	92	6004
55	0	6	0	14	68	232	401	380	126	3	7	0	1237
57	0	0	0	8	45	185	343	325	96	1	0	0	1003
60	0	0	0	3	21	125	259	246	60	0	0	0	714
65	0	0	0	0	3	53	142	140	23	0	0	0	361
70	0	0	0	0	0	15	62	66	7	0	0	0	150

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	17	63	200	434	680	882	851	525	244	45	12	4	21	84	284	718	1398	2280	3131	3656	3900	3945	3957
45	0	5	20	105	289	530	727	696	382	128	15	0	0	5	25	130	419	949	1676	2372	2754	2882	2897	2897
50	0	0	0	47	162	382	572	541	250	59	1	0	0	0	0	47	209	591	1163	1704	1954	2013	2014	2014
55	0	0	0	13	71	242	417	386	139	20	0	0	0	0	0	13	84	326	743	1129	1268	1288	1288	1288
60	0	0	0	0	21	129	267	241	62	4	0	0	0	0	0	0	21	150	417	658	720	724	724	724
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	12	33	82	187	314	443	562	546	378	222	57	18	12	45	127	314	628	1071	1633	2179	2557	2779	2836	2854

(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