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: TROY, MT **COOP ID: 248390**

Climate Division: MT 1 **NWS Call Sign:** **Elevation: 1,929 Feet** **Lat: 48˚29N** **Lon: 115˚54W**

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	32.7	19.8	26.3	55	1998	2	36.7	1994	-24	1962	21	11.6	1979	1202	0	.0	.0	.4	12.5	28.4	3.0
Feb	39.6	23.0	31.3	62	1995	23	38.5	1992	-20	1989	5	19.8	1989	943	0	.0	.0	1.8	4.6	25.8	1.6
Mar	49.9	27.6	38.8	78+	1994	16	46.4	1992	-5+	1989	3	32.2	1976	815	0	.0	.0	15.1	.5	24.4	.2
Apr	60.8	33.1	47.0	87+	1977	26	52.4	1994	8	1975	1	41.9	1975	542	0	.0	.0	27.1	.0	16.1	.0
May	68.9	40.5	54.7	97+	2001	24	59.7	1993	22+	1973	1	50.6	1996	323	4	.0	.5	30.9	.0	5.3	.0
Jun	76.3	46.6	61.5	100	1973	22	65.6	1992	27	1985	25	57.1	1981	137	30	@	2.5	30.0	.0	.4	.0
Jul	84.7	50.0	67.4	106	1994	23	73.2	1998	26	1962	18	60.5	1993	60	133	.8	10.5	31.0	.0	.1	.0
Aug	85.2	48.9	67.1	106+	1994	14	71.4	1971	31	1980	30	62.1	1995	62	125	1.3	11.1	31.0	.0	@	.0
Sep	73.5	41.6	57.6	102+	1998	7	64.2	1990	17	1985	29	52.4	1985	249	25	.1	1.3	29.9	.0	3.1	.0
Oct	58.2	34.4	46.3	83	1991	16	51.2	1988	8	1971	29	42.7	1984	581	0	.0	.0	25.7	.1	15.1	.0
Nov	40.5	28.9	34.7	69+	1999	13	41.9	1999	-13	1985	28	22.4	1985	909	0	.0	.0	3.3	3.9	20.2	.4
Dec	32.9	21.7	27.3	55+	1979	10	32.1	1980	-35	1968	30	17.9	1983	1169	0	.0	.0	.5	13.1	28.4	1.5
Ann	58.6	34.7	46.7	106+	Aug 1994	14	73.2	Jul 1998	-35	Dec 1968	30	11.6	Jan 1979	6992	317	2.2	25.9	226.7	34.7	167.3	6.7

\+ 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: 1960-2001

(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	3.00	2.85	2.09	1969	13	7.85	1974	.25	1985
Feb	2.29	1.87	1.31	1996	8	5.79	1996	.18	1989
Mar	1.90	1.79	.94	1997	17	5.06	1997	.36	1992
Apr	1.63	1.49	1.25	1991	5	3.35	1991	.33	1973
May	2.04	1.87	3.34	1998	27	7.09	1998	.54	1999
Jun	1.97	1.89	1.50	1974	23	4.85	1995	.44	1989
Jul	1.38	1.04	1.97	1997	30	3.48	1993	.00	1973
Aug	1.19	.88	1.84	1986	30	3.75	1976	.00	2000
Sep	1.30	1.40	.95+	1968	18	3.29	1985	.12	1990
Oct	1.89	1.44	1.03	1999	31	5.25	1995	.04	1987
Nov	3.66	3.75	1.81	1990	25	7.87	1973	.57	1979
Dec	3.21	2.85	2.09	1964	22	7.60	1996	.66	1985
Ann	25.46	25.44	3.34	May 1998	27	7.87	Nov 1973	.00+	Aug 2000

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	12.3	7.3	1.6	.2
Feb	10.4	6.2	.9	.2
Mar	10.4	6.2	.7	.0
Apr	9.4	4.9	.6	.1
May	12.0	5.5	.6	@
Jun	12.2	5.0	.8	.2
Jul	8.1	3.7	.5	.1
Aug	6.9	3.5	.5	.1
Sep	7.9	4.2	.5	.0
Oct	8.9	5.7	.7	@
Nov	14.0	9.1	1.8	.5
Dec	13.2	7.8	1.7	.2
Ann	125.7	69.1	10.9	1.6

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	.77	1.06	1.49	1.88	2.25	2.65	3.10	3.62	4.31	5.40	6.41
Feb	.43	.64	.97	1.28	1.60	1.94	2.32	2.79	3.41	4.41	5.36
Mar	.44	.62	.89	1.14	1.39	1.66	1.95	2.30	2.77	3.50	4.20
Apr	.44	.59	.83	1.03	1.24	1.45	1.69	1.97	2.34	2.91	3.44
May	.56	.75	1.04	1.30	1.55	1.82	2.11	2.46	2.91	3.61	4.28
Jun	.56	.75	1.03	1.27	1.51	1.76	2.04	2.37	2.79	3.45	4.07
Jul	.14	.30	.53	.73	.93	1.15	1.41	1.71	2.11	2.76	3.38
Aug	.09	.22	.41	.59	.77	.97	1.20	1.47	1.85	2.46	3.04
Sep	.24	.35	.54	.72	.90	1.10	1.32	1.59	1.95	2.52	3.07
Oct	.19	.33	.59	.85	1.14	1.46	1.84	2.31	2.96	4.03	5.08
Nov	.85	1.19	1.73	2.21	2.68	3.19	3.76	4.43	5.32	6.73	8.05
Dec	.86	1.16	1.63	2.03	2.43	2.85	3.32	3.87	4.59	5.71	6.76
Ann	17.92	19.38	21.24	22.66	23.92	25.14	26.41	27.80	29.50	31.96	34.09

\+ 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: 1960-2001
(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	9.2	5.7	7	6
Feb	9.1	4.0	5	1
Mar	1.9	1.0	1	0
Apr	.2	.0	#	0
May	.0	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.0	.0	0	0
Oct	.4	.0	#	0
Nov	8.6	9.4	1	0
Dec	16.9	8.5	4	3
Ann	46.3	28.6	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	8.0	1980	12	25.8	1980	25	1985	1	16	1982
Feb	15.0	1986	15	29.0	1986	34	1986	16	17	1978
Mar	4.3	1980	4	7.0	1987	19	1978	1	8	1985
Apr	2.0	1986	12	2.0	1986	3	1982	15	#+	1986
May	.0	0	0	.0	0	#	1985	11	#	1985
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	.0	0	0	.0	0	0	0	0	0	0
Oct	3.0	1984	27	4.6	1984	3	1984	28	#	1984
Nov	6.0	1984	28	12.0	1984	11	1984	30	2+	1986
Dec	12.0	1984	30	42.5	1984	30	1984	30	11	1984
Ann	15.0	Feb 1986	15	42.5	Dec 1984	34	Feb 1986	16	17	Feb 1978

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	5.4	3.6	1.2	.5	.0
Feb	4.2	3.0	.8	.4	.2
Mar	.9	.6	.3	.0	.0
Apr	.1	.1	.0	.0	.0
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	.4	.1	.1	.0	.0
Nov	-9.9	-9.9	-9.9	-9.9	-9.9
Dec	8.0	4.6	1.9	.7	.3
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	12.3	9.2	6.9	4.8
Mar	4.2	3.4	2.9	.9
Apr	.1	.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	.2	.1	.0	.0
Nov	5.7	2.8	.9	.1
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	7/11	7/03	6/28	6/23	6/19	6/14	6/09	6/04	5/27
32	6/15	6/08	6/03	5/29	5/25	5/21	5/16	5/11	5/04
28	5/29	5/22	5/16	5/11	5/07	5/02	4/28	4/22	4/15
24	5/03	4/26	4/22	4/17	4/14	4/10	4/05	4/01	3/25
20	4/18	4/09	4/02	3/27	3/22	3/16	3/11	3/04	2/23
16	3/29	3/19	3/13	3/07	3/02	2/25	2/19	2/12	2/03

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	8/18	8/24	8/29	9/01	9/05	9/08	9/12	9/16	9/22
32	9/03	9/09	9/13	9/17	9/20	9/23	9/27	10/01	10/07
28	9/15	9/22	9/27	10/01	10/05	10/09	10/14	10/19	10/26
24	9/23	9/30	10/06	10/11	10/15	10/20	10/25	10/30	11/07
20	10/02	10/12	10/20	10/27	11/02	11/08	11/15	11/23	12/04
16	10/25	11/04	11/12	11/19	11/25	12/01	12/07	12/15	12/25

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	111	100	91	84	78	71	64	55	44
32	149	138	130	124	117	111	105	97	86
28	187	175	166	158	151	143	136	127	114
24	217	206	198	191	184	178	171	163	151
20	264	251	241	232	225	217	208	199	185
16	310	295	284	275	267	259	250	239	224

***** 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	1202	943	815	542	323	137	60	62	249	581	909	1169	6992
60	1047	803	660	393	188	52	17	19	142	426	759	1014	5520
57	954	719	567	307	124	22	7	8	92	335	669	921	4725
55	892	663	505	253	89	11	3	3	65	276	609	859	4228
50	739	523	357	136	30	1	0	0	21	146	467	704	3124
32	267	131	29	0	0	0	0	0	0	1	93	213	734

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	89	111	237	449	704	883	1096	1086	766	443	174	67	6105
55	0	0	0	11	80	204	386	376	141	5	0	0	1203
57	0	0	0	5	53	155	328	319	108	2	0	0	970
60	0	0	0	1	24	95	245	237	68	0	0	0	670
65	0	0	0	0	4	30	133	125	25	0	0	0	317
70	0	0	0	0	0	5	57	51	7	0	0	0	120

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	0	1	54	216	444	631	833	830	520	194	25	0	0	1	55	271	715	1346	2179	3009	3529	3723	3748	3748
45	0	0	13	107	295	481	678	675	373	86	4	0	0	0	13	120	415	896	1574	2249	2622	2708	2712	2712
50	0	0	0	37	163	333	523	520	235	27	0	0	0	0	0	37	200	533	1056	1576	1811	1838	1838	1838
55	0	0	0	10	77	199	369	366	121	3	0	0	0	0	0	10	87	286	655	1021	1142	1145	1145	1145
60	0	0	0	0	29	95	226	222	47	0	0	0	0	0	0	0	29	124	350	572	619	619	619	619
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	0	1	52	171	300	403	522	526	355	139	7	0	0	1	53	224	524	927	1449	1975	2330	2469	2476	2476

(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