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: HARLOWTON, MT **COOP ID: 243939**

Climate Division: MT 4 **NWS Call Sign: 3HT** **Elevation: 4,162 Feet** **Lat: 46˚26N** **Lon: 109˚50W**

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	34.6	11.6	23.1	69	1981	22	35.1	1986	-38	1957	25	8.3	1979	1299	0	.0	.0	4.6	10.2	28.2	7.3
Feb	40.2	15.0	27.6	74	1950	26	38.2	1991	-39	1949	13	12.2	1989	1047	0	.0	.0	8.4	6.2	25.2	4.4
Mar	47.5	20.7	34.1	75	1986	28	42.9	1986	-29+	1989	4	27.5	1989	957	0	.0	.0	14.8	2.9	27.5	1.4
Apr	57.3	28.4	42.9	87	1952	25	49.6	1987	-2+	1997	12	34.1	1975	665	0	.0	.0	22.4	.6	19.9	.1
May	66.7	36.7	51.7	91	1954	19	56.1	1987	4	1953	12	47.6	1996	413	1	.0	.0	28.9	.0	7.1	.0
Jun	75.9	44.4	60.2	98	1984	29	68.8	1988	24	1953	25	55.3	1998	179	34	.0	2.2	29.9	.0	.4	.0
Jul	83.4	48.2	65.8	101	1953	14	69.8	1985	33+	1972	4	58.3	1993	79	105	.1	6.1	31.0	.0	.0	.0
Aug	83.2	47.1	65.2	101	1961	5	71.7	1971	24	1992	25	60.4	1974	102	105	@	5.8	31.0	.0	.1	.0
Sep	72.5	38.3	55.4	98	1998	4	61.8	1998	10+	1985	30	48.8	1985	306	17	.0	1.1	29.0	.0	4.8	.0
Oct	60.6	30.0	45.3	90	1992	1	49.9	1988	-8	1991	30	39.9	1984	612	0	.0	@	25.2	.3	16.3	.1
Nov	43.3	20.3	31.8	78+	1949	5	41.7	1999	-29	1959	13	14.8	1985	996	0	.0	.0	9.9	4.6	25.4	1.7
Dec	35.7	13.7	24.7	65	1952	15	34.6	1999	-39	1964	17	7.8	1983	1250	0	.0	.0	4.3	9.0	28.4	5.2
Ann	58.4	29.5	44.0	101+	Aug 1961	5	71.7	Aug 1971	-39+	Dec 1964	17	7.8	Dec 1983	7905	262	.1	15.2	239.4	33.8	183.3	20.2

\+ 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

Issue Date: February 2004

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Climate Division: MT 4 **NWS Call Sign: 3HT** **Elevation: 4,162 Feet** **Lat: 46˚26N** **Lon: 109˚50W**

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	.45	.39	.79	1975	26	1.48	1972	.00	1987
Feb	.39	.34	.97	1953	28	1.74	1986	.00	1998
Mar	.73	.61	.68+	1989	30	2.50	1989	.11	1972
Apr	1.30	1.06	1.70	1950	28	3.86	1994	.12	1985
May	2.22	2.11	1.97	1967	30	4.96	1981	.82	1973
Jun	2.71	2.42	2.44	1997	6	9.76	1997	.53	1988
Jul	1.74	1.62	1.31	1993	3	5.07	1993	.29	1984
Aug	1.61	1.47	1.42	1985	3	4.27	1985	.17	2000
Sep	1.15	1.06	1.43	1959	21	2.64	1977	.07	1979
Oct	.77	.59	1.05	1975	21	2.76	1975	.02	1987
Nov	.52	.41	.85	1968	4	1.34	1996	.06	1992
Dec	.49	.39	.90	1955	23	1.43	1977	.00	1993
Ann	14.08	13.68	2.44	Jun 1997	6	9.76	Jun 1997	.00+	Feb 1998

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	5.7	1.4	.1	.0
Feb	5.0	1.3	@	.0
Mar	7.4	2.5	.1	.0
Apr	9.1	3.7	.7	.1
May	11.5	5.7	1.2	.4
Jun	12.3	6.1	1.2	.5
Jul	10.0	4.8	.8	.2
Aug	8.6	4.1	1.0	.1
Sep	6.5	3.2	.5	.0
Oct	4.9	2.2	.4	.1
Nov	5.3	1.9	.1	.0
Dec	5.6	1.6	.1	.0
Ann	91.9	38.5	6.2	1.4

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	.01	.04	.10	.16	.23	.32	.42	.55	.73	1.04	1.35
Feb	.01	.04	.10	.15	.22	.29	.37	.48	.63	.88	1.12
Mar	.16	.22	.33	.43	.52	.63	.74	.88	1.07	1.36	1.64
Apr	.24	.35	.54	.72	.90	1.09	1.32	1.58	1.94	2.51	3.06
May	.81	1.02	1.32	1.57	1.81	2.05	2.32	2.63	3.03	3.64	4.20
Jun	.61	.86	1.26	1.61	1.97	2.35	2.78	3.29	3.96	5.03	6.04
Jul	.33	.49	.75	.98	1.22	1.48	1.77	2.12	2.58	3.33	4.04
Aug	.19	.32	.54	.77	1.01	1.27	1.58	1.96	2.48	3.33	4.16
Sep	.17	.26	.43	.59	.76	.94	1.15	1.40	1.75	2.31	2.85
Oct	.06	.12	.22	.33	.44	.58	.74	.94	1.21	1.68	2.13
Nov	.06	.10	.18	.25	.32	.41	.51	.63	.80	1.08	1.35
Dec	.02	.07	.14	.21	.29	.37	.47	.60	.77	1.05	1.33
Ann	9.38	10.26	11.41	12.29	13.07	13.84	14.63	15.51	16.59	18.16	19.53

+ 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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Climate Division: MT 4 **NWS Call Sign: 3HT** **Elevation: 4,162 Feet** **Lat: 46˚26N** **Lon: 109˚50W**

Snow (inches)

Snow Totals

Means/Medians (1)

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median
Jan	5.6	6.0	1	#
Feb	5.1	3.5	1	1
Mar	6.5	4.7	1	#
Apr	4.5	2.0	#	0
May	1.1	.0	#	0
Jun	#	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	1.0	.0	#	0
Oct	2.2	.2	#	0
Nov	4.8	3.6	1	#
Dec	4.9	3.6	1	1
Ann	35.7	23.6	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	1975	26	15.2	1989	10	1979	15	6	1978
Feb	7.0	1986	15	18.4	1986	12	1986	19	6	1978
Mar	8.0	1989	30	31.0	1989	9	1989	17	3	1989
Apr	10.2	1976	26	20.2	1976	12	1976	27	1	1982
May	7.2	1981	11	9.0	1981	5	1981	11	#+	1984
Jun	#	1982	7	#	1982	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	6.2	1983	19	8.4+	1984	7	1983	19	#+	1988
Oct	6.0	1975	21	16.1	1975	7	1975	22	1	1975
Nov	7.8	1978	19	16.4	1985	12	1978	21	4	1985
Dec	12.0	1996	29	14.7	1978	10	1978	7	5	1983
Ann	12.0	Dec 1996	29	31.0	Mar 1989	12+	Feb 1986	19	6+	Feb 1978

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	4.8	2.2	.5	.2	.0
Feb	4.1	2.0	.4	.1	.0
Mar	4.5	2.6	.8	.2	.0
Apr	2.2	1.7	.5	.2	@
May	.6	.4	.1	@	.0
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.4	.3	.2	@	.0
Oct	1.0	.7	.3	.1	.0
Nov	3.2	2.0	.3	.1	.0
Dec	4.2	2.1	.5	.2	@
Ann	25.0	14.0	3.6	1.1	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	11.4	5.9	2.7	.1
Feb	9.4	5.3	2.3	.3
Mar	4.8	2.5	1.0	.0
Apr	1.1	.5	.2	@
May	.2	.1	@	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.3	@	@	.0
Oct	1.1	.5	.2	.0
Nov	6.8	2.8	1.1	.2
Dec	9.8	4.5	1.6	.1
Ann	44.9	22.1	9.1	.7

+ 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	7/07	6/30	6/26	6/21	6/18	6/14	6/09	6/05	5/29
32	6/10	6/05	6/02	5/30	5/27	5/25	5/22	5/18	5/14
28	5/26	5/22	5/18	5/15	5/13	5/10	5/07	5/04	4/29
24	5/16	5/11	5/07	5/04	5/01	4/28	4/25	4/21	4/16
20	4/30	4/26	4/22	4/19	4/17	4/14	4/11	4/08	4/04
16	4/20	4/15	4/11	4/08	4/05	4/02	3/30	3/26	3/21

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	8/20	8/24	8/27	8/30	9/02	9/04	9/07	9/10	9/14
32	9/04	9/08	9/10	9/12	9/14	9/16	9/18	9/21	9/24
28	9/10	9/15	9/18	9/21	9/24	9/26	9/29	10/02	10/07
24	9/14	9/20	9/24	9/28	10/01	10/04	10/08	10/12	10/18
20	9/26	10/02	10/06	10/09	10/13	10/16	10/19	10/23	10/29
16	10/06	10/12	10/16	10/20	10/23	10/26	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	100	92	86	80	75	70	65	59	50
32	126	120	116	112	109	106	102	98	92
28	152	146	141	137	133	129	125	120	114
24	173	166	161	157	152	148	144	139	131
20	198	191	186	182	178	174	170	165	158
16	219	212	208	204	200	196	192	188	181

***** 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	1299	1047	957	665	413	179	79	102	306	612	996	1250	7905
60	1144	907	802	515	268	88	25	41	188	457	846	1095	6376
57	1051	823	709	429	191	49	11	21	130	365	756	1002	5537
55	989	767	647	373	147	31	6	13	98	305	696	940	5012
50	848	638	499	244	64	7	0	2	39	173	558	798	3870
32	380	238	98	13	0	0	0	0	0	4	164	338	1235

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	104	115	163	339	611	845	1048	1027	701	415	158	111	5637
55	0	0	0	9	45	186	341	326	109	4	0	0	1020
57	0	0	0	4	27	144	284	272	82	2	0	0	815
60	0	0	0	0	11	93	205	199	49	0	0	0	557
65	0	0	0	0	1	34	105	105	17	0	0	0	262
70	0	0	0	0	0	9	38	41	5	0	0	0	93

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	17	26	53	163	388	624	826	801	490	236	49	10	17	43	96	259	647	1271	2097	2898	3388	3624	3673	3683
45	0	3	16	84	247	474	671	646	349	129	20	0	0	3	19	103	350	824	1495	2141	2490	2619	2639	2639
50	0	0	1	32	135	331	517	491	221	61	2	0	0	0	1	33	168	499	1016	1507	1728	1789	1791	1791
55	0	0	0	7	57	197	364	342	115	20	0	0	0	0	0	7	64	261	625	967	1082	1102	1102	1102
60	0	0	0	0	17	100	215	198	43	3	0	0	0	0	0	0	17	117	332	530	573	576	576	576
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	5	25	62	145	271	397	526	512	341	194	40	8	5	30	92	237	508	905	1431	1943	2284	2478	2518	2526

(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