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: GLENDIVE, MT **COOP ID: 243581**

Climate Division: MT 6 **NWS Call Sign:** **Elevation: 2,076 Feet** **Lat: 47˚06N** **Lon: 104˚43W**

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	25.3	3.6	14.5	63	1931	29	28.6	1992	-48	1916	12	-3.0	1982	1568	0	.0	.0	.9	17.3	30.6	12.1
Feb	33.7	10.7	22.2	73	1932	27	34.0	1998	-50	1936	16	5.1	1979	1198	0	.0	.0	4.8	10.9	27.1	6.9
Mar	44.9	20.2	32.6	85	1910	22	41.3	1986	-30	1922	1	20.5	1996	1007	0	.0	.0	13.6	5.3	27.2	2.3
Apr	58.9	31.7	45.3	94	1897	26	51.2	1980	-6	1899	1	37.6	1975	592	0	.0	.1	23.6	.6	14.0	@
May	70.4	43.7	57.1	104	1934	29	64.1	1977	16+	1909	1	51.2	1996	275	28	.1	1.6	29.8	.0	1.9	.0
Jun	80.2	53.3	66.8	110	1988	8	79.7	1988	29	1917	1	60.0	1998	91	144	.9	5.7	30.0	.0	.0	.0
Jul	87.3	58.3	72.8	117	1893	20	77.0	1983	37	1934	6	63.9	1993	25	266	3.0	14.4	31.0	.0	.0	.0
Aug	87.0	55.9	71.5	113	1893	6	79.9	1983	32+	1911	27	64.7	1977	49	248	2.8	14.5	31.0	.0	.0	.0
Sep	74.4	44.4	59.4	106	1983	1	68.3	1998	14	1907	29	53.6	1986	221	53	.3	4.0	29.1	.0	1.7	.0
Oct	61.2	33.7	47.5	95	1946	1	51.2	1979	-13	1919	26	43.0	1991	545	0	.0	.2	26.0	.4	11.9	.1
Nov	41.0	20.2	30.6	80	1987	1	42.1	1999	-27+	1985	30	15.8	1985	1032	0	.0	.0	9.2	7.0	26.7	1.7
Dec	29.3	8.7	19.0	72	1939	5	31.4	1999	-42	1989	22	-.9	1983	1426	0	.0	.0	2.0	14.8	30.7	7.7
Ann	57.8	32.0	44.9	117	Jul 1893	20	79.9	Aug 1983	-50	Feb 1936	16	-3.0	Jan 1982	8029	739	7.1	40.5	231.0	56.3	171.8	30.8

\+ 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: 1893-2001

(3) Derived from 1971-2000 serially complete daily data

Issue Date: February 2004

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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	.41	.27	.70	1897	21	1.23	1971	.02	1981
Feb	.33	.21	.80	1902	27	1.02	1978	.01	1983
Mar	.57	.49	1.30	1894	20	1.67	1982	.02	1999
Apr	1.17	1.06	2.00	1940	21	3.63	1992	.03	1988
May	2.08	1.83	2.22	1926	27	5.20	1978	.20	1980
Jun	2.50	2.23	2.67	1956	18	4.84	1991	.73	1988
Jul	1.80	1.58	3.55	1916	16	6.33	1993	.15	1984
Aug	1.44	1.14	5.70	1916	5	5.54	1980	.10	2000
Sep	1.43	.80	3.40	1916	10	5.67	1986	.04	1989
Oct	1.00	.66	1.98	1971	2	4.58	1971	.03	1978
Nov	.49	.35	1.51	2000	2	2.23	2000	.02+	1999
Dec	.40	.36	.75	1916	25	1.06	1977	.02+	1991
Ann	13.62	13.65	5.70	Aug 1916	5	6.33	Jul 1993	.01	Feb 1983

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	5.1	1.5	.1	.0
Feb	4.3	1.1	.0	.0
Mar	6.1	2.0	.1	.0
Apr	6.9	3.3	.4	.1
May	10.3	5.2	1.3	.3
Jun	10.8	5.7	1.5	.4
Jul	8.1	3.9	1.1	.3
Aug	6.6	3.0	.9	.2
Sep	6.2	3.1	.8	.3
Oct	5.0	2.4	.6	.2
Nov	5.1	1.5	.1	@
Dec	5.4	1.2	@	.0
Ann	79.9	33.9	6.9	1.8

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	.04	.07	.13	.19	.25	.32	.40	.50	.64	.86	1.09
Feb	.02	.04	.08	.13	.18	.24	.31	.40	.53	.74	.95
Mar	.07	.12	.20	.28	.36	.46	.57	.70	.88	1.18	1.47
Apr	.10	.18	.33	.49	.67	.87	1.11	1.42	1.84	2.54	3.23
May	.39	.57	.88	1.16	1.45	1.76	2.11	2.54	3.10	4.01	4.88
Jun	.67	.91	1.27	1.59	1.90	2.22	2.58	3.01	3.57	4.44	5.26
Jul	.31	.47	.73	.98	1.23	1.50	1.82	2.20	2.70	3.52	4.30
Aug	.13	.23	.42	.62	.84	1.09	1.38	1.75	2.26	3.10	3.93
Sep	.04	.10	.25	.43	.65	.92	1.25	1.69	2.33	3.44	4.57
Oct	.07	.13	.25	.39	.54	.72	.94	1.22	1.60	2.26	2.90
Nov	.02	.05	.10	.17	.24	.33	.44	.59	.79	1.14	1.50
Dec	.04	.08	.13	.19	.25	.31	.39	.48	.62	.83	1.04
Ann	7.84	8.87	10.23	11.30	12.27	13.23	14.24	15.37	16.77	18.84	20.67

\+ 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: 1893-2001
(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	5.3	4.0	4	3
Feb	4.7	2.7	4	2
Mar	3.5	2.3	1	1
Apr	1.8	.0	#	#
May	.1	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.1	.0	#	0
Oct	.7	.0	#	0
Nov	2.7	1.3	1	#
Dec	3.9	3.3	2	2
Ann	22.8	13.6	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	6.0	1971	10	17.0	1971	15+	1982	25	13	1979
Feb	8.0	1998	26	14.8	1979	27	1979	17	20	1979
Mar	6.0	1987	21	14.5	1975	16	1979	4	6	1978
Apr	5.0	2000	14	7.0	1995	6	1995	10	1	1997
May	1.6	1996	9	1.6	1996	9	1983	12	#+	1999
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	2.0	1972	25	2.0	1972	2	1972	25	#+	1995
Oct	5.0	1972	29	7.0	1972	4	1995	31	1	1991
Nov	6.0	1986	18	15.1	1986	14	1977	26	5	1978
Dec	5.0	1980	23	10.7	1971	11	1985	20	8	1996
Ann	8.0	Feb 1998	26	17.0	Jan 1971	27	Feb 1979	17	20	Feb 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	4.1	2.3	.6	.2	.0
Feb	3.6	1.7	.6	.2	.0
Mar	2.8	1.8	.2	.1	.0
Apr	.7	.5	.3	@	.0
May	@	@	.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
Oct	.4	.3	.1	@	.0
Nov	2.1	1.5	.4	.1	.0
Dec	3.7	2.0	.3	.1	.0
Ann	17.4	10.1	2.5	.7	.0

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	16.9	13.2	6.8	.8
Feb	10.5	7.4	6.5	1.9
Mar	5.9	2.9	1.9	.1
Apr	1.1	.4	.1	.0
May	@	.0	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	@	.0	.0	.0
Oct	.2	.1	.0	.0
Nov	4.8	2.2	.7	.1
Dec	13.1	5.8	1.8	.0
Ann	52.5	32.0	17.8	2.9

+ 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	5/25	5/21	5/18	5/15	5/13	5/10	5/07	5/04	4/30
32	5/14	5/10	5/07	5/04	5/02	4/29	4/27	4/24	4/20
28	5/06	5/02	4/29	4/26	4/23	4/21	4/18	4/15	4/11
24	4/26	4/21	4/17	4/14	4/12	4/09	4/06	4/02	3/29
20	4/18	4/13	4/10	4/07	4/04	4/01	3/29	3/26	3/21
16	4/15	4/08	4/04	3/31	3/27	3/23	3/19	3/14	3/07

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	9/07	9/11	9/14	9/16	9/19	9/21	9/24	9/26	9/30
32	9/16	9/21	9/24	9/26	9/29	10/01	10/04	10/07	10/11
28	9/24	9/29	10/03	10/06	10/09	10/12	10/15	10/19	10/24
24	10/03	10/08	10/12	10/15	10/19	10/22	10/25	10/29	11/03
20	10/13	10/18	10/22	10/25	10/28	11/01	11/04	11/08	11/13
16	10/21	10/27	10/30	11/03	11/06	11/09	11/12	11/16	11/22

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	149	142	137	133	128	124	120	115	107
32	167	161	157	153	149	146	142	137	131
28	188	181	176	172	168	164	160	155	148
24	209	202	197	193	189	185	181	176	169
20	230	222	216	211	207	202	197	191	183
16	250	241	234	229	224	218	213	206	197

***** 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	1568	1198	1007	592	275	91	25	49	221	545	1032	1426	8029
60	1413	1064	852	446	164	39	8	19	125	391	882	1271	6674
57	1322	987	761	363	112	21	1	9	81	301	792	1178	5928
55	1262	934	702	311	83	13	0	5	58	244	738	1116	5466
50	1120	804	558	197	33	3	0	1	20	125	598	972	4431
32	627	405	167	10	0	0	0	0	0	3	203	482	1897

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	82	131	183	408	776	1043	1265	1222	822	481	161	79	6653
55	4	16	5	20	146	366	552	514	189	9	5	0	1826
57	2	13	2	12	113	314	491	456	153	4	0	0	1560
60	0	6	0	5	72	242	404	373	107	1	0	0	1210
65	0	0	0	0	28	144	266	248	53	0	0	0	739
70	0	0	0	0	8	73	157	150	21	0	0	0	409

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	10	57	251	567	827	1042	1014	627	293	41	0	0	10	67	318	885	1712	2754	3768	4395	4688	4729	4729
45	0	0	18	148	418	677	887	859	480	180	12	0	0	0	18	166	584	1261	2148	3007	3487	3667	3679	3679
50	0	0	4	77	284	528	732	704	343	93	2	0	0	0	4	81	365	893	1625	2329	2672	2765	2767	2767
55	0	0	0	31	166	383	578	549	218	33	0	0	0	0	0	31	197	580	1158	1707	1925	1958	1958	1958
60	0	0	0	9	83	242	423	400	122	10	0	0	0	0	0	9	92	334	757	1157	1279	1289	1289	1289
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	12	65	185	350	517	661	636	397	211	36	3	0	12	77	262	612	1129	1790	2426	2823	3034	3070	3073

(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