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: OPHEIM 12 SSE, MT **COOP ID: 246238**

Climate Division: MT 6 **NWS Call Sign:** **Elevation: 2,950 Feet** **Lat: 48˚42N** **Lon: 106˚19W**

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	17.7	-4.8	6.5	53	1993	31	20.4	1981	-49	1954	20	-9.7	1982	1817	0	.0	.0	.1	23.7	30.9	15.9
Feb	25.2	3.4	14.3	66	1992	27	26.5	1998	-46	1962	28	-1.6	1979	1419	0	.0	.0	.9	16.1	28.2	10.3
Mar	37.7	15.9	26.8	75	1993	23	36.1	1986	-32+	1996	6	16.2	1996	1184	0	.0	.0	6.7	9.7	30.1	3.9
Apr	53.1	27.5	40.3	89	1980	20	48.2	1987	-9	1975	1	32.2	1975	741	0	.0	.0	19.0	1.5	22.1	.2
May	65.5	38.1	51.8	98+	1988	29	59.0	1988	11+	1954	2	46.3	1979	414	6	.0	.3	28.6	@	7.7	.0
Jun	74.1	46.8	60.5	105	1988	5	72.4	1988	21+	1951	3	55.9	1985	178	42	.1	2.1	30.0	.0	.5	.0
Jul	80.2	51.0	65.6	102+	1985	22	70.7	1989	31	1951	10	58.8	1972	90	107	.2	4.7	31.0	.0	.0	.0
Aug	80.1	49.6	64.9	105	1983	6	72.1	1983	24	1950	19	57.7	1977	131	127	.2	5.9	31.0	.0	.2	.0
Sep	67.4	38.4	52.9	100	1983	1	60.5	1998	8	1995	21	46.7	1985	380	16	@	1.0	27.7	.1	6.2	.0
Oct	54.4	28.1	41.3	91	1992	1	45.6	1973	-14	1991	30	37.1	1972	735	0	.0	@	21.3	1.5	20.9	.2
Nov	35.0	12.5	23.8	74+	1999	12	35.0	1999	-28	1985	27	7.7	1985	1239	0	.0	.0	4.6	11.2	28.9	4.5
Dec	22.1	-.5	10.8	54	1987	4	23.0	1999	-41	1989	22	-6.2	1983	1682	0	.0	.0	.4	21.4	30.9	13.5
Ann	51.0	25.5	38.3	105+	Jun 1988	5	72.4	Jun 1988	-49	Jan 1954	20	-9.7	Jan 1982	10010	298	.5	14.0	201.3	85.2	206.6	48.5

\+ 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: 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	.24	.21	.35	1992	24	.58+	1999	.02	1973
Feb	.20	.16	.38	1954	24	.92	1978	.04+	1997
Mar	.39	.35	.56	1953	23	.99	1982	.03	1977
Apr	.79	.64	2.01	1970	29	2.82	1975	.11+	1988
May	1.93	1.76	1.54	1994	17	4.93	1982	.35	1993
Jun	2.58	2.28	2.24	1972	9	6.53	1991	.20	1985
Jul	2.16	2.30	2.38	1983	10	7.00	1993	.03	1984
Aug	1.25	1.15	2.22	1960	4	3.32	1972	.17	1984
Sep	1.18	.71	3.41	1978	11	6.13	1978	.13	1994
Oct	.65	.51	1.37	1981	12	2.10	1975	.05	1987
Nov	.30	.26	.46	1981	18	1.18	1996	.00+	1987
Dec	.27	.26	.38	1955	23	.63+	1977	.00	1997
Ann	11.94	11.53	3.41	Sep 1978	11	7.00	Jul 1993	.00+	Dec 1997

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	5.6	.6	.0	.0
Feb	4.5	.5	.0	.0
Mar	6.1	1.1	@	.0
Apr	6.1	2.3	.3	.1
May	8.8	5.3	.9	.3
Jun	9.9	5.9	1.5	.4
Jul	8.7	4.7	1.3	.4
Aug	6.7	3.3	.7	.1
Sep	5.5	2.9	.6	.2
Oct	3.9	1.8	.4	@
Nov	4.8	1.1	.0	.0
Dec	6.1	.6	.0	.0
Ann	76.7	30.1	5.7	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	.03	.05	.09	.12	.16	.19	.24	.29	.36	.48	.59
Feb	.02	.04	.06	.09	.12	.15	.19	.24	.31	.41	.52
Mar	.07	.11	.17	.22	.27	.33	.40	.47	.58	.75	.90
Apr	.08	.13	.24	.35	.47	.60	.76	.96	1.23	1.68	2.12
May	.40	.58	.86	1.12	1.38	1.66	1.97	2.34	2.84	3.63	4.37
Jun	.57	.81	1.19	1.53	1.87	2.23	2.64	3.13	3.77	4.79	5.76
Jul	.29	.46	.77	1.07	1.39	1.74	2.14	2.64	3.31	4.42	5.48
Aug	.22	.33	.51	.68	.86	1.05	1.27	1.53	1.88	2.45	2.99
Sep	.10	.18	.34	.50	.68	.89	1.13	1.44	1.86	2.57	3.27
Oct	.06	.10	.19	.28	.38	.49	.63	.80	1.03	1.41	1.79
Nov	.00	.00	.08	.14	.19	.24	.31	.38	.48	.65	.80
Dec	.04	.08	.12	.16	.20	.24	.28	.34	.40	.51	.61
Ann	7.45	8.27	9.36	10.19	10.95	11.69	12.46	13.32	14.38	15.94	17.30

\+ 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

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	7.4	7.0	5	4
Feb	5.9	4.5	5	4
Mar	6.1	5.3	3	2
Apr	2.9	2.0	#	#
May	1.7	.0	#	0
Jun	#	.0	#	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.3	.0	#	0
Oct	2.1	.1	#	#
Nov	7.3	6.0	2	1
Dec	7.7	8.0	4	3
Ann	41.4	32.9	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	6.0	1971	24	20.0	1971	24	1971	31	13	1971
Feb	5.0	1972	22	18.5	1978	24	1971	8	18	1979
Mar	6.0	1985	22	14.0	1976	17	1978	2	9	1979
Apr	6.0	1979	23	18.0	1979	7	1982	4	4	1979
May	10.0	1979	6	15.0	1979	8	1983	12	1	1983
Jun	#	1998	2	#	1998	#	1998	2	#	1998
Jul	.0	0	0	.0	0	0	0	0	0	0
Aug	.0	0	0	.0	0	0	0	0	0	0
Sep	3.0	1983	30	3.0	1983	2	1983	30	#+	2000
Oct	4.0	1975	13	9.0+	1984	6	1975	14	1	1985
Nov	8.0	1993	23	28.0	1996	14	1996	19	7	1996
Dec	5.0	1972	1	17.1	1996	16	1975	2	10	1975
Ann	10.0	May 1979	6	28.0	Nov 1996	24+	Feb 1971	8	18	Feb 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	5.2	4.1	.7	@	.0
Feb	4.0	3.1	.4	.1	.0
Mar	4.0	3.4	.7	@	.0
Apr	1.5	1.3	.4	.1	.0
May	.6	.6	.2	.1	@
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.2	.2	@	.0	.0
Oct	1.1	1.0	.3	.0	.0
Nov	3.5	3.0	1.0	.2	.0
Dec	5.4	4.7	.7	@	.0
Ann	25.5	21.4	4.4	.5	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	28.5	21.2	13.3	4.5
Feb	21.1	13.8	9.1	4.7
Mar	13.9	7.4	4.4	.9
Apr	3.0	1.5	.8	.0
May	.6	.2	.1	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.2	.0	.0	.0
Oct	1.6	.6	@	.0
Nov	10.5	5.5	3.4	.9
Dec	23.6	15.6	9.6	1.3
Ann	103.0	65.8	40.7	12.3

+ 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	7/05	6/27	6/21	6/16	6/11	6/06	6/01	5/26	5/18
32	6/09	6/04	5/31	5/28	5/25	5/22	5/19	5/15	5/10
28	5/29	5/24	5/20	5/16	5/13	5/10	5/07	5/03	4/27
24	5/20	5/14	5/10	5/07	5/04	5/01	4/27	4/23	4/18
20	5/07	5/01	4/27	4/24	4/21	4/17	4/14	4/10	4/04
16	4/23	4/18	4/14	4/10	4/07	4/04	4/01	3/28	3/22

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	8/11	8/17	8/21	8/25	8/28	9/01	9/05	9/09	9/15
32	9/02	9/05	9/07	9/10	9/12	9/14	9/16	9/18	9/22
28	9/06	9/11	9/14	9/17	9/20	9/22	9/25	9/28	10/03
24	9/14	9/19	9/23	9/27	9/30	10/03	10/06	10/10	10/15
20	9/20	9/26	9/30	10/04	10/07	10/11	10/14	10/19	10/25
16	9/30	10/06	10/11	10/15	10/19	10/22	10/27	10/31	11/07

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	109	98	90	84	78	71	65	57	46
32	125	119	115	112	109	106	102	98	93
28	152	144	138	133	129	124	119	113	105
24	171	163	158	153	148	143	138	133	125
20	193	185	179	174	169	164	159	153	145
16	219	210	204	199	194	189	184	177	169

***** 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	1817	1419	1184	741	414	178	90	131	380	735	1239	1682	10010
60	1662	1279	1029	592	278	91	31	65	255	580	1089	1527	8478
57	1569	1195	936	505	207	53	14	39	191	488	999	1434	7630
55	1507	1139	874	449	166	35	8	27	152	426	939	1372	7094
50	1352	1007	723	317	85	10	0	9	76	278	790	1217	5864
32	826	556	266	37	0	0	0	0	0	16	331	693	2725

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	31	61	104	286	615	854	1041	1018	626	304	83	34	5057
55	0	0	0	8	68	199	336	332	88	1	0	0	1032
57	0	0	0	4	47	158	280	282	67	0	0	0	838
60	0	0	0	1	25	106	203	215	41	0	0	0	591
65	0	0	0	0	6	42	107	127	16	0	0	0	298
70	0	0	0	0	0	12	41	61	5	0	0	0	119

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	16	128	388	629	802	782	419	150	13	0	0	1	17	145	533	1162	1964	2746	3165	3315	3328	3328
45	0	0	1	65	255	480	647	628	288	72	0	0	0	0	1	66	321	801	1448	2076	2364	2436	2436	2436
50	0	0	0	21	143	334	492	476	171	23	0	0	0	0	0	21	164	498	990	1466	1637	1660	1660	1660
55	0	0	0	7	67	196	343	328	85	5	0	0	0	0	0	7	74	270	613	941	1026	1031	1031	1031
60	0	0	0	0	24	98	199	194	33	0	0	0	0	0	0	0	24	122	321	515	548	548	548	548
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	2	23	116	264	386	505	495	284	130	15	0	0	2	25	141	405	791	1296	1791	2075	2205	2220	2220

(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