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: FORT ASSINNIBOINE, MT **COOP ID: 243110**

Climate Division: MT 3 **NWS Call Sign:** **Elevation: 2,613 Feet** **Lat: 48˚30N** **Lon: 109˚48W**

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	24.5	3.4	14.0	68	1992	31	29.9	1992	-49	1969	24	-3.4	1982	1583	0	.0	.0	1.9	15.6	29.1	11.7
Feb	33.0	10.8	21.9	75	1992	27	36.2	1991	-48	1936	15	5.3	1979	1207	0	.0	.0	5.9	10.2	26.0	7.5
Mar	44.8	20.3	32.6	77	1999	26	41.5	1986	-34	1947	5	21.4	1996	1006	0	.0	.0	14.9	4.6	26.7	2.2
Apr	58.5	31.7	45.1	94	1939	29	51.9	1980	-14	1967	22	34.1	1975	598	1	.0	@	24.7	.7	16.2	.1
May	68.4	41.3	54.9	101	1918	30	61.6	1988	11	1954	2	49.0	1974	327	12	.0	.7	29.9	.0	3.7	.0
Jun	77.9	49.4	63.7	108	1984	29	73.4	1988	30+	1979	1	59.0	1981	114	75	.3	3.8	30.0	.0	.1	.0
Jul	84.3	53.4	68.9	106+	1933	27	74.1	1985	37	1952	7	61.2	1993	44	163	1.3	11.0	31.0	.0	.0	.0
Aug	85.0	52.6	68.8	111	1961	6	76.3	1971	30	1981	31	63.4	1977	70	187	1.4	12.3	31.0	.0	.1	.0
Sep	72.6	42.0	57.3	102	1967	5	65.1	1998	12	1944	30	49.3	1985	272	40	.1	2.7	29.0	.0	3.3	.0
Oct	59.4	30.8	45.1	91+	1980	7	49.2	1979	-21	1991	29	39.3	1984	618	0	.0	@	26.1	.8	15.3	.2
Nov	40.3	18.2	29.3	78	1975	5	39.4	1999	-28	1985	23	10.3	1985	1073	0	.0	.0	9.8	6.9	25.5	3.0
Dec	29.4	8.2	18.8	69	1939	5	33.6	1999	-44+	1989	22	-4.1	1983	1432	0	.0	.0	3.0	13.2	29.2	8.4
Ann	56.5	30.2	43.4	111	Aug 1961	6	76.3	Aug 1971	-49	Jan 1969	24	-4.1	Dec 1983	8344	478	3.1	30.5	237.2	52.0	175.2	33.1

\+ 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: 1917-2001

(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	.48	.43	.74	1959	25	2.23	1971	.00	1973
Feb	.33	.29	.47	1986	6	.92	1986	.02	1990
Mar	.66	.54	.96	1938	28	2.00	1977	.00+	1994
Apr	.99	.77	2.00	1955	4	2.86	1975	.00+	1988
May	2.18	1.65	2.54	1974	13	6.15	1974	.22	1988
Jun	2.29	1.87	2.92	1959	27	6.68	1995	.23	1985
Jul	1.77	1.33	2.97	1983	10	7.27	1992	.00	1984
Aug	1.33	1.03	2.45	1968	15	4.66	1989	.03	1988
Sep	1.23	.92	2.43	1986	25	6.40	1986	.10	1991
Oct	.77	.67	1.68	1980	22	2.47	1980	.03	1987
Nov	.48	.43	.62+	1998	29	1.18+	1989	.01	1972
Dec	.51	.49	.74	1977	16	2.11	1989	.00	1991
Ann	13.02	12.64	2.97	Jul 1983	10	7.27	Jul 1992	.00+	Mar 1994

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	6.4	1.6	.0	.0
Feb	4.2	1.1	.0	.0
Mar	6.0	1.9	.2	@
Apr	7.1	2.9	.3	.1
May	10.2	4.9	1.0	.5
Jun	10.0	5.1	1.5	.4
Jul	7.7	4.5	.8	.3
Aug	7.0	2.9	.9	.2
Sep	6.8	3.1	.6	.2
Oct	5.2	2.3	.2	@
Nov	5.2	1.7	.1	.0
Dec	5.9	1.8	@	.0
Ann	81.7	33.8	5.6	1.7

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	.02	.05	.12	.19	.26	.35	.46	.59	.77	1.08	1.38
Feb	.03	.05	.10	.14	.19	.25	.31	.40	.51	.70	.89
Mar	.00	.07	.20	.30	.41	.53	.66	.83	1.05	1.41	1.77
Apr	.00	.17	.37	.53	.69	.85	1.03	1.24	1.52	1.98	2.41
May	.38	.57	.89	1.19	1.49	1.83	2.20	2.66	3.27	4.26	5.20
Jun	.39	.60	.93	1.24	1.56	1.91	2.31	2.79	3.43	4.47	5.47
Jul	.09	.25	.52	.78	1.06	1.37	1.73	2.18	2.80	3.81	4.80
Aug	.09	.17	.34	.52	.73	.96	1.25	1.62	2.13	2.99	3.84
Sep	.12	.21	.38	.55	.74	.95	1.20	1.50	1.92	2.62	3.31
Oct	.08	.13	.24	.35	.46	.60	.75	.94	1.21	1.64	2.07
Nov	.03	.06	.12	.19	.26	.35	.45	.58	.76	1.06	1.37
Dec	.01	.04	.10	.17	.26	.35	.47	.62	.83	1.19	1.54
Ann	7.31	8.32	9.66	10.72	11.68	12.64	13.64	14.77	16.17	18.25	20.09

+ 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: 1917-2001
(3) Derived from 1971-2000 serially complete daily data

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Snow (inches)

Snow Totals

Means/Medians (1)

Extremes (2)

Mean Number of Days (1)

Snow Fall >= Thresholds

Snow Depth >= Thresholds

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median	Highest Daily Snow Fall	Year	Day	Highest Monthly Snow Fall	Year	Highest Daily Snow Depth	Year	Day	Highest Monthly Mean Snow Depth	Year	0.1	1.0	3.0	5.0	10.0	1	3	5	10
Jan	2.8	1.4	6	6	7.0	1971	31	9.8	1996	23	1971	31	17	1971	4.2	2.2	.6	.2	.0	-9.9	-9.9	-9.9	-9.9
Feb	5.0	5.4	5	3	6.0	1982	22	10.5	1993	26	1978	12	23	1978	3.2	1.7	.3	.1	.0	9.4	7.4	5.4	3.4
Mar	2.1	1.6	3	1	5.0	1982	16	6.7	1989	29	1977	29	16	1971	2.5	1.5	.3	.1	.0	3.7	2.4	1.1	.2
Apr	1.3	.0	#	0	6.0	1997	4	6.0	1997	17	1977	2	4	1975	.3	.3	.2	.1	.0	.1	.1	@	.0
May	.2	.0	#	0	4.0	2000	12	4.0	2000	10	1982	29	1	1982	.1	.1	.1	.0	.0	@	@	.0	.0
Jun	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Jul	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Aug	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Sep	#	.0	#	0	#	2000	21	#	2000	#	2000	21	#	2000	.0	.0	.0	.0	.0	.0	.0	.0	.0
Oct	.9	.0	#	0	4.5	1999	27	8.5	1991	7+	1991	31	1	1991	.4	.3	.1	.0	.0	.2	@	@	.0
Nov	5.0	4.2	1	#	5.8	1988	14	10.0	1998	10	1978	17	5	1978	3.2	1.8	.3	.1	.0	3.7	1.4	.2	.0
Dec	8.2	7.3	3	2	8.0	1989	9	28.8	1989	15	1989	31	10	1989	4.4	2.5	.8	.2	.0	8.0	5.8	3.8	1.7
Ann	25.5	19.9	N/A	N/A	8.0	Dec 1989	9	28.8	Dec 1989	29	Mar 1977	29	23	Feb 1978	18.3	10.4	2.7	.8	.0	-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	6/12	6/07	6/04	6/01	5/29	5/26	5/24	5/20	5/16
32	5/28	5/24	5/20	5/17	5/15	5/12	5/09	5/06	5/01
28	5/17	5/12	5/09	5/06	5/03	4/30	4/27	4/24	4/19
24	5/02	4/27	4/24	4/22	4/20	4/17	4/15	4/12	4/07
20	4/23	4/18	4/14	4/11	4/09	4/06	4/03	3/30	3/25
16	4/16	4/10	4/07	4/03	4/01	3/29	3/25	3/22	3/16

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	8/23	8/28	9/01	9/04	9/07	9/10	9/13	9/17	9/22
32	9/06	9/11	9/14	9/17	9/19	9/22	9/25	9/28	10/03
28	9/14	9/19	9/22	9/24	9/27	9/29	10/02	10/05	10/10
24	9/22	9/27	10/01	10/05	10/08	10/11	10/15	10/18	10/24
20	10/03	10/08	10/12	10/15	10/18	10/21	10/25	10/29	11/03
16	10/11	10/17	10/21	10/25	10/28	11/01	11/05	11/09	11/15

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	122	114	109	104	100	96	91	86	79
32	150	142	136	132	127	122	118	112	104
28	171	162	156	151	146	142	136	130	122
24	192	185	180	175	171	166	162	156	149
20	212	205	200	196	192	188	184	179	172
16	232	224	219	214	210	206	201	196	189

***** 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	1583	1207	1006	598	327	114	44	70	272	618	1073	1432	8344
60	1430	1079	851	456	200	47	12	28	168	463	923	1277	6934
57	1339	1001	759	374	140	23	5	15	117	372	833	1185	6163
55	1280	948	699	323	107	14	1	9	88	312	780	1130	5691
50	1138	820	554	211	46	2	0	2	36	180	640	986	4615
32	651	427	156	14	0	0	0	0	0	6	237	514	2005

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	91	144	173	406	708	950	1142	1140	758	411	154	105	6182
55	7	21	3	26	102	274	430	436	156	4	8	8	1475
57	4	17	1	17	73	223	372	381	124	2	0	1	1215
60	1	12	0	8	40	157	286	301	85	1	0	0	891
65	0	0	0	1	12	75	163	187	40	0	0	0	478
70	0	0	0	0	1	25	78	103	16	0	0	0	223

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	6	18	66	226	497	728	923	914	558	263	47	10	6	24	90	316	813	1541	2464	3378	3936	4199	4246	4256
45	0	5	23	124	349	578	768	759	412	155	18	0	0	5	28	152	501	1079	1847	2606	3018	3173	3191	3191
50	0	0	2	64	217	429	613	604	280	77	4	0	0	0	2	66	283	712	1325	1929	2209	2286	2290	2290
55	0	0	0	20	113	283	459	451	163	31	0	0	0	0	0	20	133	416	875	1326	1489	1520	1520	1520
60	0	0	0	3	46	162	308	301	81	8	0	0	0	0	0	3	49	211	519	820	901	909	909	909
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	1	19	63	183	330	456	578	573	370	207	35	5	1	20	83	266	596	1052	1630	2203	2573	2780	2815	2820

(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