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: WIBAUX 2 E, MT **COOP ID: 248957**

Climate Division: MT 7 **NWS Call Sign:** **Elevation: 2,670 Feet** **Lat: 46˚59N** **Lon: 104˚09W**

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	24.4	2.1	13.3	60+	1995	10	27.1	1992	-42	1982	10	-3.2	1979	1604	0	.0	.0	.9	19.1	30.7	14.0
Feb	32.0	9.6	20.8	69+	1992	27	31.8	1984	-44	1962	28	2.9	1989	1238	0	.0	.0	3.2	12.1	27.5	8.2
Mar	42.6	18.2	30.4	78	1999	26	38.7	1986	-32	1996	8	18.8	1996	1073	0	.0	.0	10.8	6.9	29.5	3.3
Apr	56.0	28.3	42.2	92	1980	21	48.7	1987	-11	1986	15	35.6	1975	685	0	.0	.1	21.5	.7	20.2	.3
May	67.7	39.0	53.4	101	1980	22	60.1	1977	12	1954	3	47.4	1996	372	11	@	.6	29.7	.0	6.3	.0
Jun	77.1	47.9	62.5	109	1988	20	76.2	1988	26+	1985	4	57.7	1998	153	79	.5	3.4	30.0	.0	.6	.0
Jul	84.5	51.9	68.2	109	1960	20	71.6	1983	31	1972	4	59.8	1993	56	156	1.4	9.7	31.0	.0	@	.0
Aug	84.1	51.1	67.6	110	1949	7	74.8	1983	26	1950	19	61.6	1974	83	164	1.1	10.3	31.0	.0	.2	.0
Sep	71.7	40.0	55.9	104	1983	1	63.9	1998	7	1949	13	50.1	1986	306	30	.3	2.5	28.9	.0	5.0	.0
Oct	57.9	29.9	43.9	93	1997	2	47.2	1973	-7	1991	30	40.0	1991	655	0	.0	.1	23.8	.5	18.9	.1
Nov	38.7	16.8	27.8	78	1999	7	40.1	1999	-26	1993	24	13.5	1985	1118	0	.0	.0	7.8	8.7	28.1	3.5
Dec	27.7	6.2	17.0	62+	1987	4	27.3	1999	-42	1989	21	-1.5	1983	1490	0	.0	.0	1.6	16.6	30.8	11.0
Ann	55.4	28.4	41.9	110	Aug 1949	7	76.2	Jun 1988	-44	Feb 1962	28	-3.2	Jan 1979	8833	440	3.3	26.7	220.2	64.6	197.8	40.4

\+ 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	.29	.22	.50	1970	26	.85	1971	.00+	1988
Feb	.29	.23	.55	1963	24	1.33	1998	.00	1976
Mar	.59	.52	.97	1989	27	2.29	1982	.07	1986
Apr	1.31	1.12	1.87	1992	18	3.68	1989	.00	1980
May	2.29	1.71	2.46	1989	29	5.78	1978	.27	1984
Jun	2.56	2.25	1.76	1973	18	5.04	1973	.73	1979
Jul	2.02	1.72	2.85	1958	3	7.94	1993	.48	1973
Aug	1.50	1.30	3.50	1964	29	3.93	1998	.00	2000
Sep	1.49	1.11	2.05	1991	15	4.91	1986	.04	1990
Oct	1.21	.65	2.38	1971	2	4.86	1971	.12	1973
Nov	.47	.34	.90	1948	4	1.66	2000	.05	1988
Dec	.25	.23	.60	1969	27	.90	1975	.00+	1992
Ann	14.27	14.43	3.50	Aug 1964	29	7.94	Jul 1993	.00+	Aug 2000

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	3.6	.9	.0	.0
Feb	3.4	1.0	@	.0
Mar	4.2	1.7	.2	.0
Apr	6.1	4.0	.5	.1
May	8.7	5.8	1.1	.3
Jun	9.0	6.2	1.5	.5
Jul	6.7	4.8	1.1	.4
Aug	5.1	3.0	.9	.3
Sep	5.3	3.5	.9	.2
Oct	4.3	2.7	.7	.3
Nov	4.3	1.5	@	.0
Dec	3.6	.8	.0	.0
Ann	64.3	35.9	6.9	2.1

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	.00	.03	.08	.12	.17	.22	.29	.36	.46	.62	.79
Feb	.03	.06	.10	.15	.19	.24	.29	.35	.44	.58	.71
Mar	.06	.11	.19	.27	.36	.46	.57	.71	.91	1.23	1.54
Apr	.06	.17	.37	.56	.77	1.00	1.28	1.62	2.08	2.86	3.62
May	.46	.67	1.00	1.31	1.62	1.96	2.33	2.79	3.39	4.35	5.27
Jun	.78	1.03	1.39	1.70	2.01	2.32	2.67	3.07	3.60	4.41	5.17
Jul	.42	.61	.90	1.17	1.45	1.74	2.06	2.46	2.98	3.80	4.59
Aug	.09	.23	.47	.69	.92	1.18	1.48	1.85	2.35	3.18	3.98
Sep	.09	.17	.36	.56	.79	1.06	1.38	1.80	2.38	3.38	4.36
Oct	.06	.13	.28	.44	.62	.84	1.11	1.46	1.95	2.78	3.60
Nov	.06	.09	.16	.23	.30	.37	.46	.58	.73	.98	1.22
Dec	.00	.04	.08	.12	.16	.21	.25	.31	.39	.51	.63
Ann	8.46	9.51	10.89	11.97	12.95	13.91	14.91	16.04	17.43	19.49	21.30

\+ 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	6.3	4.5	5	3
Feb	3.6	2.0	3	1
Mar	5.5	3.5	1	#
Apr	3.4	2.0	#	#
May	.8	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.2	.0	#	0
Oct	1.7	.0	#	#
Nov	4.7	4.5	1	#
Dec	4.0	5.0	3	1
Ann	30.2	21.5	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	9.0	1995	16	25.0	1971	26	1986	4	24	1986
Feb	11.0	1998	28	11.0	1978	26	1979	22	23	1979
Mar	11.0	1982	30	29.0	1982	13	1998	17	6	1996
Apr	8.0	1997	5	13.0	1991	10	1997	9	6	1975
May	11.0	1983	12	13.0	1983	8	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	4.0	1984	23	4.0	1984	1	1984	24	#	1984
Oct	6.0	1985	8	8.0	1985	4	1982	5	#+	1999
Nov	6.0	1992	9	15.0	1986	18	2000	19	9	2000
Dec	3.0	1978	10	8.0	1993	20	1985	30	14+	2000
Ann	11.0+	Feb 1998	28	29.0	Mar 1982	26+	Jan 1986	4	24	Jan 1986

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	2.2	2.2	.5	.1	.0
Feb	2.1	2.1	.5	.1	@
Mar	2.2	2.2	.5	.1	@
Apr	1.0	1.0	.4	.3	.0
May	.2	.2	.1	.1	@
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.1	.1	.1	.0	.0
Oct	.6	.5	.3	.1	.0
Nov	2.1	2.0	.4	.1	.0
Dec	2.4	2.2	.2	.0	.0
Ann	12.9	12.5	3.0	.9	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	-9.9	-9.9	-9.9	-9.9
Feb	-9.9	-9.9	-9.9	-9.9
Mar	1.3	1.0	.4	.2
Apr	.8	.4	.2	.0
May	.1	.1	@	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	@	.0	.0	.0
Oct	.2	@	.0	.0
Nov	2.3	1.0	.2	.0
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	7/08	6/29	6/23	6/17	6/12	6/08	6/02	5/27	5/18
32	6/13	6/06	6/01	5/28	5/24	5/20	5/16	5/11	5/04
28	5/31	5/25	5/21	5/17	5/14	5/10	5/07	5/03	4/27
24	5/11	5/07	5/04	5/01	4/29	4/26	4/24	4/21	4/17
20	5/09	5/03	4/29	4/25	4/22	4/19	4/15	4/11	4/05
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	8/17	8/23	8/27	8/30	9/02	9/05	9/09	9/13	9/18
32	8/27	9/01	9/05	9/08	9/11	9/14	9/17	9/21	9/26
28	9/05	9/11	9/15	9/19	9/23	9/26	9/30	10/04	10/10
24	9/14	9/20	9/25	9/29	10/03	10/06	10/10	10/15	10/21
20	9/23	9/29	10/03	10/07	10/11	10/14	10/18	10/22	10/28
16	10/03	10/09	10/13	10/17	10/20	10/24	10/27	11/01	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	112	102	94	87	81	75	68	60	50
32	138	128	121	115	109	104	98	91	81
28	158	149	142	136	131	126	120	114	104
24	179	171	165	161	156	152	147	141	133
20	195	187	181	176	171	166	161	155	147
16	222	213	206	201	195	190	184	178	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	1604	1238	1073	685	372	153	56	83	306	655	1118	1490	8833
60	1449	1098	918	536	242	78	17	35	194	500	968	1335	7370
57	1356	1020	825	450	177	46	8	19	138	407	878	1242	6566
55	1295	969	764	394	139	31	3	12	106	347	818	1180	6058
50	1145	838	618	266	66	10	0	3	46	204	679	1027	4902
32	642	422	189	20	0	0	0	0	0	6	250	528	2057

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	61	108	139	325	662	916	1123	1104	714	375	122	61	5710
55	0	11	1	9	88	257	413	402	130	2	0	0	1313
57	0	6	0	5	63	212	356	348	102	1	0	0	1093
60	0	0	0	2	36	154	272	270	68	0	0	0	802
65	0	0	0	0	11	79	156	164	30	0	0	0	440
70	0	0	0	0	2	31	74	85	11	0	0	0	203

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	5	34	164	444	697	898	883	507	206	29	0	0	5	39	203	647	1344	2242	3125	3632	3838	3867	3867
45	0	0	5	86	302	547	743	728	367	110	8	0	0	0	5	91	393	940	1683	2411	2778	2888	2896	2896
50	0	0	1	40	179	398	588	573	240	51	0	0	0	0	1	41	220	618	1206	1779	2019	2070	2070	2070
55	0	0	0	10	89	259	434	419	140	12	0	0	0	0	0	10	99	358	792	1211	1351	1363	1363	1363
60	0	0	0	2	36	142	285	274	66	3	0	0	0	0	0	2	38	180	465	739	805	808	808	808
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	8	43	145	299	439	568	559	345	168	30	1	0	8	51	196	495	934	1502	2061	2406	2574	2604	2605

(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