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: CHINOOK, MT **COOP ID: 241722**

Climate Division: MT 3 **NWS Call Sign:** **Elevation: 2,345 Feet** **Lat: 48˚35N** **Lon: 109˚14W**

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	25.9	-.5	12.7	67	1984	4	29.1	1992	-50	1954	20	-5.2	1982	1624	0	.0	.0	2.8	16.7	30.4	13.2
Feb	33.4	6.2	19.8	75	1995	24	32.8	1991	-44+	1994	8	3.7	1979	1265	0	.0	.0	5.8	10.8	27.5	7.9
Mar	45.1	16.7	30.9	78+	1999	26	40.3	1986	-36	1960	3	22.0	1996	1058	0	.0	.0	14.1	4.4	28.7	2.2
Apr	58.9	29.9	44.4	92	1980	20	51.4	1980	-10+	1986	14	33.4	1975	618	0	.0	@	24.3	.4	17.8	.1
May	69.1	40.8	55.0	96+	1980	21	60.6	1988	11	1954	2	49.4	1974	318	7	.0	.6	30.0	.0	4.0	.0
Jun	77.8	49.9	63.9	104+	1988	4	73.7	1988	28	1979	1	59.4	1981	108	74	.2	3.4	30.0	.0	.2	.0
Jul	84.0	53.1	68.6	105+	1963	22	72.2	1989	36	1987	12	61.7	1993	38	147	.6	9.0	31.0	.0	.0	.0
Aug	83.7	51.4	67.6	109	1961	5	72.8	1971	29	1988	27	62.0	1980	69	148	.4	9.3	31.0	.0	.1	.0
Sep	72.1	38.6	55.4	104	1998	4	63.1	1998	13	1995	21	49.0	1985	314	25	@	1.8	28.9	.0	5.6	.0
Oct	59.2	27.2	43.2	90	1992	1	45.8	1979	-24	1991	29	38.2	1972	675	0	.0	@	25.8	.6	19.3	.1
Nov	40.3	13.4	26.9	79	1999	13	37.9	1999	-38	1985	23	6.6	1985	1145	0	.0	.0	9.8	7.8	28.2	3.4
Dec	29.7	3.7	16.7	66+	1998	14	31.6	1999	-50	1989	22	-7.1	1983	1497	0	.0	.0	3.5	14.1	30.2	9.2
Ann	56.6	27.5	42.1	109	Aug 1961	5	73.7	Jun 1988	-50+	Dec 1989	22	-7.1	Dec 1983	8729	401	1.2	24.1	237.0	54.8	192.0	36.1

\+ 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: 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	.54	.41	1.10	1983	6	1.99	1971	.00+	1985
Feb	.32	.26	.43	1982	22	1.22	1994	.00	1981
Mar	.56	.49	.60	1998	17	1.34	1998	.00	1973
Apr	.99	.86	2.11	1955	4	2.56	1973	.03	1972
May	2.29	1.60	2.36	1949	17	6.14	1974	.39	1976
Jun	2.29	2.02	2.95	1965	17	5.19	1995	.01	1985
Jul	1.66	1.40	3.15	1983	10	5.20	1992	.00	1994
Aug	1.34	1.06	2.50	1974	8	5.49	1974	.02	1988
Sep	1.43	.93	5.50	1986	24	8.83	1986	.12	1974
Oct	.66	.55	1.10	1980	22	2.05	1995	.00	1978
Nov	.47	.41	.61	1998	29	1.20	1998	.01+	1982
Dec	.51	.38	.96	1977	16	2.11	1977	.00+	1999
Ann	13.06	13.04	5.50	Sep 1986	24	8.83	Sep 1986	.00+	Dec 1999

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	5.6	2.0	.1	@
Feb	3.7	1.1	.0	.0
Mar	5.2	2.2	.1	.0
Apr	6.2	2.9	.4	@
May	9.6	4.6	1.3	.5
Jun	9.1	5.1	1.2	.4
Jul	8.1	4.0	.9	.2
Aug	6.7	3.4	.8	.1
Sep	6.8	3.4	.7	.1
Oct	4.5	2.1	.2	.1
Nov	4.8	1.7	.1	.0
Dec	5.0	1.6	@	.0
Ann	75.3	34.1	5.8	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	.00	.03	.12	.20	.29	.39	.52	.67	.88	1.24	1.59
Feb	.01	.04	.08	.13	.18	.24	.30	.39	.51	.70	.89
Mar	.07	.14	.23	.31	.39	.48	.58	.69	.84	1.09	1.32
Apr	.07	.13	.26	.40	.55	.72	.93	1.20	1.57	2.19	2.80
May	.52	.73	1.06	1.36	1.67	1.98	2.34	2.77	3.34	4.23	5.08
Jun	.29	.48	.80	1.12	1.46	1.83	2.26	2.80	3.52	4.70	5.85
Jul	.04	.15	.37	.60	.87	1.17	1.55	2.02	2.69	3.82	4.94
Aug	.11	.19	.37	.55	.76	1.00	1.28	1.63	2.12	2.95	3.77
Sep	.11	.20	.39	.58	.80	1.05	1.35	1.73	2.26	3.15	4.02
Oct	.04	.10	.20	.30	.40	.52	.65	.81	1.03	1.39	1.74
Nov	.03	.06	.12	.19	.26	.34	.44	.57	.74	1.04	1.33
Dec	.00	.00	.06	.15	.25	.35	.48	.63	.85	1.21	1.57
Ann	7.71	8.67	9.94	10.93	11.82	12.71	13.63	14.67	15.94	17.83	19.50

\+ 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	6.5	4.8	4	4
Feb	4.3	3.4	2	#
Mar	4.0	4.0	1	#
Apr	1.1	.0	#	0
May	.1	.0	0	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	#	.0	0	0
Oct	1.5	.0	#	0
Nov	4.7	4.5	#	#
Dec	4.3	4.3	2	1
Ann	26.5	21.0	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	6.3	1989	6	29.3	1971	17	1971	31	13	1996
Feb	6.5	1982	22	12.5	1993	17	1971	5	9	1982
Mar	6.0	1991	26	10.0	1990	11	1996	4	3	1996
Apr	6.3	2000	14	6.3	2000	11	1975	8	2	1975
May	1.5	2000	12	1.5+	2000	0	0	0	0	0
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	#	1972	28	#	1972	0	0	0	0	0
Oct	7.5	1981	12	11.0	1991	11	1991	31	1	1991
Nov	8.0	1988	14	10.5+	1996	9	1996	25	2	1996
Dec	6.0	1995	10	13.0	1990	13	1995	20	8	1983
Ann	8.0	Nov 1988	14	29.3	Jan 1971	17+	Feb 1971	5	13	Jan 1996

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	4.6	3.0	.8	.3	.0
Feb	3.0	1.9	.6	.1	.0
Mar	2.7	2.0	.7	.1	.0
Apr	.6	.5	.3	.2	.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	.0	.0
Oct	.5	.3	.1	.1	.0
Nov	2.7	1.8	.3	.1	.0
Dec	3.6	2.4	.6	.1	.0
Ann	17.7	11.9	3.4	1.0	.0

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	4.2	2.0	.5	.0
Apr	.3	.1	.0	.0
May	.0	.0	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.0	.0	.0	.0
Oct	.3	.2	.1	@
Nov	2.2	1.5	.4	.0
Dec	5.9	2.9	.9	.0
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	6/22	6/15	6/11	6/07	6/04	5/31	5/27	5/23	5/17
32	6/04	5/29	5/25	5/21	5/18	5/14	5/11	5/06	4/30
28	5/22	5/16	5/12	5/09	5/06	5/03	4/29	4/25	4/20
24	5/04	4/29	4/26	4/24	4/21	4/19	4/16	4/13	4/09
20	4/27	4/22	4/18	4/14	4/11	4/08	4/04	3/31	3/26
16	4/20	4/15	4/11	4/08	4/05	4/01	3/29	3/25	3/20

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	8/15	8/21	8/25	8/29	9/02	9/06	9/10	9/14	9/20
32	9/02	9/05	9/08	9/10	9/12	9/14	9/16	9/19	9/22
28	9/12	9/16	9/19	9/22	9/24	9/26	9/29	10/01	10/05
24	9/18	9/23	9/27	9/30	10/03	10/06	10/10	10/13	10/19
20	9/22	9/29	10/04	10/08	10/12	10/15	10/20	10/24	10/31
16	10/04	10/10	10/14	10/18	10/21	10/24	10/28	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	117	108	101	95	90	84	79	72	63
32	139	131	126	121	117	112	107	102	94
28	161	154	149	144	140	136	132	127	120
24	186	179	173	169	164	160	155	150	142
20	212	202	195	189	183	177	171	164	154
16	225	216	209	204	199	194	188	182	173

***** 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)

Base	Heating Degree Days (1)												
Below	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
65	1624	1265	1058	618	318	108	38	69	314	675	1145	1497	8729
60	1469	1128	903	474	189	42	9	26	200	520	995	1342	7297
57	1377	1053	810	391	127	20	2	13	143	428	905	1249	6518
55	1317	1000	749	339	93	11	0	7	110	367	845	1188	6026
50	1175	869	603	224	36	1	0	2	49	224	708	1048	4939
32	677	456	183	16	0	0	0	0	0	9	280	562	2183

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	76	115	149	388	712	956	1133	1102	701	357	125	88	5902
55	3	15	1	21	92	277	420	396	121	2	0	1	1349
57	1	11	0	13	64	226	359	340	94	1	0	0	1109
60	0	3	0	6	33	158	273	260	61	0	0	0	794
65	0	0	0	0	7	74	147	148	25	0	0	0	401
70	0	0	0	0	1	24	63	69	8	0	0	0	165

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	4	10	46	211	497	721	902	863	501	218	29	6	4	14	60	271	768	1489	2391	3254	3755	3973	4002	4008
45	0	0	12	112	350	571	747	708	358	116	10	0	0	0	12	124	474	1045	1792	2500	2858	2974	2984	2984
50	0	0	1	50	216	422	592	553	229	48	1	0	0	0	1	51	267	689	1281	1834	2063	2111	2112	2112
55	0	0	0	16	111	281	437	400	126	16	0	0	0	0	0	16	127	408	845	1245	1371	1387	1387	1387
60	0	0	0	2	45	153	284	254	54	4	0	0	0	0	0	2	47	200	484	738	792	796	796	796
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	3	19	57	181	328	451	571	550	352	193	33	6	3	22	79	260	588	1039	1610	2160	2512	2705	2738	2744

(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