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: ALDER 17 S, MT **COOP ID: 240110**

Climate Division: MT 2 **NWS Call Sign:** **Elevation: 5,850 Feet** **Lat: 45˚04N** **Lon: 112˚03W**

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	31.9	13.6	22.8	58	1981	22	30.3	1986	-35	1963	12	9.4	1979	1309	0	.0	.0	.9	13.8	29.9	5.9
Feb	36.5	16.9	26.7	61	1986	28	35.1	1991	-30	1982	4	12.7	1989	1072	0	.0	.0	2.7	7.3	27.0	3.4
Mar	43.2	22.7	33.0	70	1994	15	40.6	1986	-19	1960	1	26.8	1976	994	0	.0	.0	7.6	3.3	27.6	.8
Apr	52.0	28.4	40.2	80+	1987	29	47.6	1987	-2	1983	5	31.5	1975	744	0	.0	.0	17.2	.6	21.8	.1
May	60.7	35.8	48.3	86	1960	10	53.1	1987	11	1972	1	44.4	1975	520	0	.0	.0	27.2	.0	11.1	.0
Jun	69.4	42.6	56.0	95	1988	25	63.6	1988	22	1960	21	50.4	1998	280	11	.0	.2	29.5	.0	2.9	.0
Jul	78.0	47.2	62.6	95+	1966	30	66.3	1989	24	1981	8	53.8	1993	123	48	.0	1.0	31.0	.0	.4	.0
Aug	77.3	46.7	62.0	97	1961	4	67.4	1971	23	1965	30	56.8	1993	152	59	.0	.8	31.0	.0	1.1	.0
Sep	67.4	38.7	53.1	91	1967	4	59.3	1998	8	1983	20	47.0	1986	366	8	.0	.0	28.2	.0	8.1	.0
Oct	56.1	30.8	43.5	83	1992	1	48.6	1988	-9	1991	30	37.6	1984	667	0	.0	.0	23.0	.6	19.8	.1
Nov	40.1	20.9	30.5	72	1999	6	40.3	1999	-29	1959	13	19.9	2000	1036	0	.0	.0	6.8	7.1	26.3	2.1
Dec	32.1	14.0	23.1	59+	1980	16	33.7	1980	-41	1983	23	10.1	1983	1300	0	.0	.0	1.3	13.7	29.8	4.7
Ann	53.7	29.9	41.8	97	Aug 1961	4	67.4	Aug 1971	-41	Dec 1983	23	9.4	Jan 1979	8563	126	.0	2.0	206.4	46.4	205.8	17.1

\+ 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: 1956-2001

(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	.37	.30	.49	1989	23	1.06	1998	.06	1988
Feb	.33	.34	.38	1994	24	.90	1980	.00	1990
Mar	.74	.68	.98	1967	29	2.09	1990	.07	1978
Apr	1.11	.95	1.82	1975	25	3.76	1975	.20	1985
May	2.34	1.92	2.09	1985	31	4.75	1980	.81	1973
Jun	2.39	2.41	1.43	1981	13	5.28	1998	.54	1974
Jul	1.54	1.26	1.70	1975	22	4.72	1993	.09+	1999
Aug	1.47	1.48	1.33	1969	12	2.51	1999	.17	1981
Sep	1.27	1.13	1.46	1966	15	3.55	1980	.00	1979
Oct	1.05	1.03	1.00+	2000	21	4.17	2000	.00+	1988
Nov	.59	.58	.80	1983	25	1.40	1983	.07	1989
Dec	.39	.33	.65	1973	22	.86	1974	.00	1976
Ann	13.59	13.17	2.09	May 1985	31	5.28	Jun 1998	.00+	Feb 1990

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	4.3	1.3	.0	.0
Feb	3.8	1.4	.0	.0
Mar	5.8	2.5	.1	.0
Apr	7.5	3.7	.3	.1
May	11.2	7.0	1.0	.2
Jun	10.1	6.4	1.3	.2
Jul	7.8	4.5	.8	.1
Aug	7.5	4.7	.7	@
Sep	5.4	3.4	.6	.1
Oct	5.0	3.3	.6	.1
Nov	4.9	2.1	.1	.0
Dec	4.1	1.4	@	.0
Ann	77.4	41.7	5.5	.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	.06	.09	.14	.19	.25	.31	.37	.46	.57	.75	.92
Feb	.01	.04	.09	.13	.19	.25	.32	.40	.52	.73	.92
Mar	.16	.23	.33	.43	.53	.64	.76	.90	1.09	1.39	1.68
Apr	.26	.36	.53	.67	.82	.97	1.14	1.35	1.62	2.05	2.45
May	.83	1.05	1.37	1.64	1.90	2.16	2.45	2.78	3.21	3.87	4.48
Jun	.80	1.02	1.36	1.64	1.91	2.18	2.49	2.84	3.30	4.01	4.66
Jul	.15	.26	.47	.69	.92	1.18	1.49	1.88	2.41	3.30	4.16
Aug	.42	.56	.77	.95	1.13	1.32	1.52	1.76	2.08	2.57	3.03
Sep	.07	.19	.38	.57	.77	.99	1.25	1.56	2.00	2.71	3.41
Oct	.00	.18	.39	.56	.72	.90	1.09	1.32	1.62	2.11	2.57
Nov	.12	.18	.26	.34	.42	.51	.60	.72	.87	1.11	1.34
Dec	.05	.10	.17	.22	.28	.34	.40	.48	.58	.74	.90
Ann	9.10	9.95	11.05	11.89	12.65	13.38	14.14	14.98	16.01	17.52	18.83

\+ 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: 1956-2001
(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	6.8	5.0	2	1	8.5	1989	23	17.6	1979	13	1998	19	7	1979	4.3	2.2	.7	.3	.0	-9.9	-9.9	-9.9	-9.9
Feb	5.4	4.2	1	1	6.4	1979	20	12.7	1979	9	2000	25	7	1979	3.8	2.3	.4	.1	.0	-9.9	-9.9	-9.9	-9.9
Mar	10.3	9.3	1	1	12.5	1991	11	24.4	1982	11	1998	5	4	1977	4.6	2.9	1.3	.4	.1	3.5	2.0	.9	.1
Apr	8.1	5.7	#	#	12.0	1988	8	26.9	1975	9	1991	11	3	1982	3.3	2.2	.9	.4	.1	1.3	.9	.6	.0
May	2.5	1.6	#	0	9.5	1999	9	12.5	1999	10	1999	9	1	1999	1.3	.7	.4	.2	.0	.3	.2	.1	.0
Jun	.3	.0	#	0	4.2	1976	14	4.2	1976	#+	1997	24	#+	1997	.1	.1	.1	.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	.4	1992	24	.4	1992	#	1992	24	#	1992	@	.0	.0	.0	.0	.0	.0	.0	.0
Sep	.7	.0	#	0	6.2	1988	18	9.9	1988	2	1988	11	#+	2000	.3	.2	.1	@	.0	.1	.0	.0	.0
Oct	3.0	1.7	#	#	5.8	1991	27	10.2	1991	7	1991	31	1	1996	1.7	1.4	.4	.2	.0	.9	.2	.1	.0
Nov	7.4	7.6	1	#	9.2	1994	17	15.7	1992	9	1994	17	3+	2000	3.8	2.3	.8	.2	.0	3.4	2.1	1.4	.0
Dec	6.3	5.3	2	1	6.9	1991	2	13.0	1974	10	1991	2	6	1971	3.9	2.3	.6	.2	.0	-9.9	-9.9	-9.9	-9.9
Ann	50.8	40.4	N/A	N/A	12.5	Mar 1991	11	26.9	Apr 1975	13	Jan 1998	19	7+	Feb 1979	27.1	16.6	5.7	2.0	.2	-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	7/25	7/19	7/14	7/10	7/07	7/03	6/29	6/25	6/18
32	7/14	7/07	7/01	6/27	6/22	6/18	6/13	6/08	5/31
28	6/25	6/17	6/11	6/05	5/31	5/26	5/21	5/15	5/06
24	6/03	5/28	5/23	5/18	5/15	5/11	5/06	5/01	4/25
20	5/11	5/06	5/03	4/30	4/27	4/24	4/21	4/17	4/12
16	5/03	4/26	4/21	4/16	4/12	4/08	4/03	3/29	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	8/05	8/11	8/16	8/20	8/24	8/28	9/01	9/06	9/13
32	8/14	8/21	8/26	8/31	9/04	9/08	9/12	9/18	9/25
28	8/24	8/31	9/05	9/09	9/13	9/17	9/21	9/26	10/02
24	9/10	9/15	9/19	9/22	9/25	9/28	10/01	10/04	10/09
20	9/19	9/25	9/29	10/02	10/05	10/09	10/12	10/16	10/21
16	10/01	10/07	10/11	10/15	10/18	10/21	10/25	10/29	11/04

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	76	67	59	53	48	42	36	29	19
32	108	96	87	80	73	66	58	49	37
28	143	130	120	112	104	96	88	78	65
24	158	149	143	137	132	127	122	116	107
20	186	177	171	166	161	156	151	144	136
16	221	210	202	195	188	182	175	167	156

***** 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	1309	1072	994	744	520	280	123	152	366	667	1036	1300	8563
60	1154	932	839	594	367	160	46	72	235	512	886	1145	6942
57	1061	848	746	506	280	105	20	39	169	420	796	1052	6042
55	999	792	684	449	225	75	11	25	131	359	736	990	5476
50	844	652	530	312	113	24	1	6	58	220	593	835	4188
32	323	211	101	28	0	0	0	0	0	7	177	335	1182

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	37	63	130	275	504	721	948	930	632	363	131	58	4792
55	0	0	0	5	15	105	246	242	72	2	0	0	687
57	0	0	0	2	8	75	193	194	51	1	0	0	524
60	0	0	0	0	2	41	126	134	27	0	0	0	330
65	0	0	0	0	0	11	48	59	8	0	0	0	126
70	0	0	0	0	0	1	11	18	1	0	0	0	31

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	3	29	105	276	487	706	680	394	173	27	0	0	3	32	137	413	900	1606	2286	2680	2853	2880	2880
45	0	0	4	48	157	343	551	526	261	88	8	0	0	0	4	52	209	552	1103	1629	1890	1978	1986	1986
50	0	0	0	15	74	210	397	374	151	27	0	0	0	0	0	15	89	299	696	1070	1221	1248	1248	1248
55	0	0	0	1	25	107	247	229	65	3	0	0	0	0	0	1	26	133	380	609	674	677	677	677
60	0	0	0	0	0	40	125	109	21	1	0	0	0	0	0	0	0	40	165	274	295	296	296	296
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	2	23	90	192	317	467	454	288	147	22	0	0	2	25	115	307	624	1091	1545	1833	1980	2002	2002

(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