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: COOKE CITY 2 W, MT **COOP ID: 241995**

Climate Division: MT 5 **NWS Call Sign:** **Elevation: 7,460 Feet** **Lat: 45˚01N** **Lon: 109˚58W**

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	23.6	2.1	12.9	48	1974	16	19.7	1998	-41	1980	27	1.5	1979	1617	0	.0	.0	.0	26.5	30.9	13.4
Feb	30.4	4.2	17.3	68	1982	18	24.3	1991	-43	1982	5	7.4	1989	1335	0	.0	.0	.3	15.3	28.2	9.8
Mar	36.8	10.1	23.5	58+	1994	16	31.4	1986	-27	1976	12	16.1	1976	1287	0	.0	.0	2.3	8.8	30.8	6.0
Apr	44.3	17.6	31.0	72+	1987	29	37.1	1987	-18	1982	8	22.4	1975	1022	0	.0	.0	9.8	2.5	29.4	1.7
May	53.7	26.5	40.1	77+	1992	20	46.0	1987	2	1984	1	34.4	1975	772	0	.0	.0	21.2	.1	25.9	.0
Jun	64.3	32.9	48.6	88	1988	26	56.8	1988	20+	1979	1	42.8	1975	493	0	.0	.0	27.9	.0	11.7	.0
Jul	73.0	37.6	55.3	89+	1990	1	59.9	1989	22	1968	1	49.7	1993	305	5	.0	.1	30.8	.0	3.1	.0
Aug	72.0	36.5	54.3	88+	1988	2	58.2	1983	20	1992	27	48.6	1975	336	3	.0	.0	30.8	.0	5.2	.0
Sep	61.6	28.9	45.3	85	1991	1	52.4	1990	3	1983	21	39.9	1972	593	0	.0	.0	25.7	.2	20.2	.0
Oct	48.9	21.6	35.3	75+	1992	3	42.1	1988	-13	1972	30	29.8	1984	922	0	.0	.0	15.9	2.1	28.7	.5
Nov	31.6	10.5	21.1	58+	1988	2	28.1	1999	-23	1986	11	13.4	2000	1320	0	.0	.0	1.1	16.0	29.3	5.0
Dec	23.1	2.3	12.7	47	1973	1	21.2	1980	-42	1972	5	1.9	1978	1622	0	.0	.0	.0	25.9	30.9	13.2
Ann	46.9	19.2	33.1	89+	Jul 1990	1	59.9	Jul 1989	-43	Feb 1982	5	1.5	Jan 1979	11624	8	.0	.1	165.8	97.4	274.3	49.6

\+ 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: 1967-2001

(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	2.29	2.21	1.08	1995	19	4.53	1971	.46	1981
Feb	1.79	1.55	.95	1976	4	4.43	1979	.41	1973
Mar	2.00	1.76	.81	1970	8	4.55	1974	.71	1973
Apr	1.78	1.75	1.80	1981	2	3.60	1993	.63	1983
May	2.69	2.63	2.08	1988	8	5.51	1981	.81	1986
Jun	2.85	2.67	1.75	1997	7	6.41	1998	1.20	1971
Jul	2.16	1.95	1.90	1983	10	4.52	1997	.65	1988
Aug	2.08	2.04	1.12	1986	22	3.58	1977	.17	1988
Sep	1.95	1.79	1.19	1971	3	4.66	1972	.24	1988
Oct	1.59	1.45	1.11	1975	22	3.97	1997	.03	1987
Nov	2.05	2.08	1.66	1996	19	4.44	1996	.45	1993
Dec	2.24	2.12	1.13	1977	2	6.51	1977	.25	1986
Ann	25.47	25.55	2.08	May 1988	8	6.51	Dec 1977	.03	Oct 1987

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	15.9	7.7	.4	.1
Feb	12.7	6.0	.3	.0
Mar	13.1	6.8	.5	.0
Apr	10.7	5.6	.4	.1
May	13.4	7.6	1.1	.2
Jun	13.3	7.4	1.2	.2
Jul	11.3	6.0	.8	@
Aug	11.8	6.0	1.0	@
Sep	9.8	5.8	.7	.1
Oct	9.3	4.8	.5	.1
Nov	13.5	5.8	.7	.1
Dec	14.5	6.7	.6	.1
Ann	149.3	76.2	8.2	1.0

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	.59	.81	1.14	1.43	1.72	2.02	2.36	2.76	3.28	4.11	4.88
Feb	.47	.64	.90	1.12	1.35	1.58	1.85	2.16	2.56	3.20	3.80
Mar	.71	.89	1.17	1.40	1.62	1.84	2.09	2.37	2.74	3.30	3.82
Apr	.66	.82	1.07	1.27	1.46	1.65	1.87	2.11	2.43	2.91	3.36
May	.94	1.19	1.56	1.87	2.17	2.48	2.81	3.20	3.70	4.47	5.17
Jun	1.12	1.38	1.76	2.07	2.36	2.66	2.98	3.36	3.83	4.56	5.23
Jul	.69	.89	1.20	1.46	1.71	1.97	2.25	2.59	3.02	3.69	4.31
Aug	.72	.92	1.20	1.44	1.68	1.91	2.18	2.48	2.87	3.47	4.02
Sep	.36	.54	.82	1.09	1.36	1.64	1.97	2.37	2.90	3.75	4.56
Oct	.30	.45	.68	.89	1.11	1.35	1.62	1.94	2.37	3.05	3.71
Nov	.65	.85	1.14	1.38	1.62	1.87	2.14	2.46	2.86	3.50	4.09
Dec	.64	.85	1.17	1.45	1.73	2.01	2.32	2.69	3.18	3.93	4.63
Ann	18.82	20.13	21.79	23.05	24.16	25.23	26.33	27.54	29.01	31.13	32.95

\+ 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: 1967-2001
(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	36.6	36.6	30	30	14.7	1998	11	73.0	1976	52	1979	15	44	1979	15.7	12.0	5.2	2.3	.2	-9.9	-9.9	-9.9	-9.9
Feb	30.7	26.4	37	37	12.0	1974	19	78.5	1978	66	1978	28	58	1997	11.6	8.7	4.0	1.6	.1	-9.9	-9.9	-9.9	-9.9
Mar	29.9	29.0	38	36	11.5	1976	1	63.0	1974	70	1996	6	56+	1997	11.6	9.1	3.1	1.1	.1	-9.9	-9.9	-9.9	-9.9
Apr	14.5	13.5	29	28	12.0	1973	20	26.5	1986	66	1982	15	58	1982	7.1	5.7	2.2	.6	.1	-9.9	-9.9	-9.9	-9.9
May	9.0	8.0	7	3	21.0	1988	8	33.8	1988	47	1975	7	27	1975	4.0	2.8	1.1	.4	.1	5.5	3.5	1.9	1.1
Jun	1.1	.0	#	0	3.1	1998	3	5.1	1998	6	1976	14	#+	1995	.5	.5	.1	.0	.0	.3	@	.0	.0
Jul	#	.0	#	0	#	1983	3	#	1983	#	1983	3	#	1983	.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	2.5	.1	#	#	7.7	2000	22	11.3	1984	8	2000	22	1	1984	1.3	1.1	.3	.1	.0	1.1	.3	.1	.0
Oct	10.3	8.3	1	1	8.0	1975	13	38.5	1975	15	1996	27	6	1996	4.6	3.7	1.4	.4	.0	5.1	2.7	1.5	.4
Nov	32.1	27.7	8	7	20.0	1975	24	74.5	1975	37	1975	24	16	1994	13.1	9.5	3.8	1.5	.1	21.3	16.5	12.7	5.9
Dec	44.3	40.1	21	20	20.0	1977	2	125.0	1977	53	1996	27	36	1996	14.2	10.8	4.9	2.1	.4	-9.9	-9.9	-9.9	-9.9
Ann	211.0	189.7	N/A	N/A	21.0	May 1988	8	125.0	Dec 1977	70	Mar 1996	6	58+	Feb 1997	83.7	63.9	26.1	10.1	1.1	-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	8/05	8/01	7/30	7/27	7/25	7/23	7/21	7/18	7/15
32	7/31	7/26	7/22	7/18	7/15	7/12	7/08	7/04	6/28
28	7/12	7/06	7/01	6/27	6/24	6/20	6/17	6/12	6/06
24	6/18	6/10	6/04	5/30	5/26	5/21	5/16	5/10	5/02
20	5/22	5/18	5/14	5/12	5/09	5/06	5/04	4/30	4/26
16	5/13	5/09	5/06	5/03	5/01	4/29	4/26	4/23	4/19

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	7/30	8/01	8/03	8/04	8/05	8/07	8/08	8/10	8/12
32	8/01	8/06	8/10	8/13	8/17	8/20	8/23	8/27	9/01
28	8/09	8/16	8/21	8/26	8/30	9/03	9/07	9/12	9/19
24	8/30	9/05	9/08	9/12	9/15	9/18	9/21	9/25	9/30
20	9/07	9/12	9/16	9/19	9/21	9/24	9/27	9/30	10/05
16	9/19	9/25	9/30	10/04	10/08	10/11	10/15	10/20	10/26

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	24	19	16	13	10	8	5	2	0
32	59	49	43	37	32	27	21	14	5
28	96	85	78	72	66	60	54	47	36
24	143	132	124	117	111	105	98	90	79
20	156	149	143	139	135	130	126	120	113
16	184	176	169	164	159	154	148	142	133

***** 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	1617	1335	1287	1022	772	493	305	336	593	922	1320	1622	11624
60	1462	1195	1132	872	617	348	171	198	447	767	1170	1467	9846
57	1369	1111	1039	782	524	266	109	132	363	674	1080	1374	8823
55	1307	1055	977	722	463	216	77	96	309	612	1020	1312	8166
50	1152	915	822	572	319	115	22	34	192	459	870	1157	6629
32	594	418	288	132	21	0	0	0	6	49	349	601	2458

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	0	7	24	100	272	497	722	690	403	150	19	3	2887
55	0	0	0	0	1	23	86	73	16	0	0	0	199
57	0	0	0	0	0	14	57	47	10	0	0	0	128
60	0	0	0	0	0	5	25	20	4	0	0	0	54
65	0	0	0	0	0	0	5	3	0	0	0	0	8
70	0	0	0	0	0	0	0	0	0	0	0	0	0

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	0	0	18	106	320	509	464	226	50	0	0	0	0	0	18	124	444	953	1417	1643	1693	1693	1693
45	0	0	0	0	39	190	357	313	114	12	0	0	0	0	0	0	39	229	586	899	1013	1025	1025	1025
50	0	0	0	0	3	90	209	169	37	0	0	0	0	0	0	0	3	93	302	471	508	508	508	508
55	0	0	0	0	0	35	88	58	9	0	0	0	0	0	0	0	0	35	123	181	190	190	190	190
60	0	0	0	0	0	5	20	5	0	0	0	0	0	0	0	0	0	5	25	30	30	30	30	30
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	0	32	109	249	378	359	211	73	0	0	0	0	0	32	141	390	768	1127	1338	1411	1411	1411

(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