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: MARBLE HILL, MO **COOP ID: 235253**

Climate Division: MO 5 **NWS Call Sign:** **Elevation: 390 Feet** **Lat: 37˚18N** **Lon: 89˚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	43.0	21.7	32.4	74+	1955	4	42.4	1990	-23+	1977	11	19.0	1977	1012	0	.0	.0	8.8	6.5	25.4	2.0
Feb	49.6	26.1	37.9	80	1962	13	45.1	2000	-27	1951	2	23.8	1978	761	0	.0	.0	14.1	3.1	19.4	.7
Mar	59.8	34.7	47.3	86	1967	12	52.8	1973	-4	1978	5	40.9	1978	551	0	.0	.0	24.7	.4	13.8	@
Apr	69.7	43.3	56.5	92	1963	22	62.3	1981	18+	1989	11	50.8	1983	267	11	.0	@	29.2	.0	5.4	.0
May	77.6	52.7	65.2	97+	1962	17	70.2	1991	28+	1980	9	61.4	1981	92	97	.0	1.1	31.0	.0	.4	.0
Jun	84.8	61.0	72.9	108	1952	30	76.0	1994	36	1972	1	68.5	1974	6	244	.3	7.2	30.0	.0	.0	.0
Jul	88.8	65.5	77.2	108	1954	18	81.5	1980	44+	1972	6	74.5	1984	0	376	1.2	16.3	31.0	.0	.0	.0
Aug	87.8	63.2	75.5	105	1964	4	81.3	1980	37	1986	30	71.2	1986	4	330	.7	12.9	31.0	.0	.0	.0
Sep	81.5	55.5	68.5	104	1954	3	74.1	1998	27	1949	30	62.3	1974	46	151	@	4.7	30.0	.0	.2	.0
Oct	71.9	43.4	57.7	95	1953	2	63.3	1971	13+	1976	29	51.3	1988	251	24	.0	.1	30.6	.0	5.6	.0
Nov	57.8	34.7	46.3	88	1987	3	51.6	1994	-12	1950	25	38.4	1976	563	0	.0	.0	22.2	.2	14.0	.0
Dec	46.5	25.7	36.1	75+	1956	3	44.2	1971	-12+	1989	22	24.7	2000	895	0	.0	.0	11.7	3.5	22.2	.7
Ann	68.2	44.0	56.1	108+	Jul 1954	18	81.5	Jul 1980	-27	Feb 1951	2	19.0	Jan 1977	4448	1233	2.2	42.3	294.3	13.7	106.4	3.4

\+ 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

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	3.23	3.10	4.80	1949	24	11.29	1982	.10	1986
Feb	3.18	2.90	3.24	1989	3	8.66	1989	1.01	1991
Mar	4.91	4.39	6.30	1977	28	11.06	1977	1.23	1971
Apr	4.58	3.81	4.12	1983	30	13.64	1983	.76	1988
May	4.59	3.91	3.73	1968	11	11.54	1973	1.48	1994
Jun	4.21	3.81	5.05	1957	30	8.33	2000	.97	1988
Jul	4.20	3.56	4.50	1975	6	11.42	1981	.40	1974
Aug	3.60	3.25	4.06	1985	5	9.40	1985	.23	1996
Sep	3.54	2.72	3.64	1972	8	10.34	1993	.37	1981
Oct	3.37	3.29	3.16	1984	21	9.13	1984	.86	1975
Nov	4.85	4.83	4.02	1994	5	11.51	1994	.32	1999
Dec	4.32	3.73	5.72	1982	3	15.72	1982	.70	1980
Ann	48.58	48.22	6.30	Mar 1977	28	15.72	Dec 1982	.10	Jan 1986

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	7.5	5.6	1.9	.9
Feb	7.1	5.5	2.4	.8
Mar	9.9	7.5	3.2	1.4
Apr	9.0	7.2	2.8	1.3
May	9.7	7.7	3.0	1.4
Jun	7.8	6.6	2.9	1.4
Jul	6.7	5.4	2.9	1.3
Aug	6.6	5.5	2.6	1.1
Sep	6.1	4.8	2.1	1.1
Oct	6.7	5.6	2.4	.8
Nov	8.7	7.0	2.8	1.6
Dec	8.2	6.3	2.8	1.1
Ann	94.0	74.7	31.8	14.2

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	.54	.82	1.29	1.73	2.19	2.68	3.25	3.94	4.86	6.35	7.77
Feb	.99	1.29	1.74	2.13	2.50	2.89	3.31	3.81	4.46	5.46	6.40
Mar	1.47	1.93	2.63	3.23	3.82	4.43	5.10	5.89	6.91	8.51	9.99
Apr	.94	1.36	2.03	2.64	3.26	3.92	4.67	5.57	6.76	8.66	10.46
May	1.39	1.82	2.47	3.03	3.58	4.15	4.77	5.50	6.45	7.93	9.30
Jun	1.29	1.69	2.29	2.80	3.30	3.81	4.38	5.04	5.90	7.25	8.49
Jul	.93	1.32	1.93	2.49	3.04	3.63	4.30	5.09	6.14	7.81	9.39
Aug	.73	1.06	1.59	2.07	2.56	3.08	3.67	4.38	5.33	6.83	8.26
Sep	.28	.51	.97	1.46	2.00	2.62	3.36	4.30	5.60	7.78	9.94
Oct	.79	1.10	1.60	2.04	2.48	2.94	3.46	4.08	4.90	6.19	7.41
Nov	.90	1.33	2.04	2.70	3.37	4.09	4.92	5.91	7.23	9.35	11.37
Dec	.99	1.39	2.02	2.59	3.16	3.76	4.43	5.23	6.29	7.97	9.55
Ann	35.13	37.75	41.10	43.63	45.87	48.04	50.28	52.75	55.73	60.06	63.79

\+ 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

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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	3.5	2.5	1	#
Feb	4.8	3.0	1	#
Mar	1.8	.5	#	0
Apr	#	.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	.1	.0	#	0
Nov	.7	#	#	0
Dec	1.7	.0	#	#
Ann	12.6	6.0	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	12.0	1978	17	26.0	1978	12	1978	21	9	1978
Feb	12.0	1993	16	19.9	1982	14	1979	26	9	1979
Mar	10.0	1994	9	11.0	1975	11	1999	15	1	1999
Apr	#	1996	6	#+	1996	#	1996	6	#	1996
May	.0	0	0	.0	0	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	.0	0	0	.0	0	0	0	0	0	0
Oct	2.0	1993	30	2.0	1993	#	1993	31	#	1993
Nov	8.5	1980	27	9.5	1980	9	1980	27	1	1980
Dec	7.0	1973	20	10.0	1990	9	1990	28	4	1988
Ann	12.0+	Feb 1993	16	26.0	Jan 1978	14	Feb 1979	26	9+	Feb 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	2.1	1.7	.7	.3	@
Feb	1.5	1.1	.4	.2	@
Mar	.6	.5	.2	.1	@
Apr	.0	.0	.0	.0	.0
May	.0	.0	.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	@	@	.0	.0	.0
Nov	.1	.1	.1	.1	.0
Dec	.8	.6	.3	.2	.0
Ann	5.1	4.0	1.7	.9	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	.3	.0	.0	.0
Feb	.4	.2	.0	.0
Mar	.4	.1	@	.0
Apr	.0	.0	.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	.0	.0	.0	.0
Nov	.1	.1	.1	.0
Dec	.4	.2	.1	.0
Ann	1.6	.6	.2	.0

+ 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	5/21	5/16	5/12	5/08	5/05	5/02	4/29	4/25	4/20
32	5/09	5/04	4/29	4/26	4/23	4/19	4/16	4/12	4/06
28	4/27	4/22	4/18	4/15	4/12	4/09	4/06	4/02	3/28
24	4/14	4/08	4/04	4/01	3/29	3/26	3/23	3/19	3/13
20	3/31	3/27	3/23	3/20	3/18	3/15	3/12	3/08	3/04
16	3/20	3/14	3/09	3/05	3/01	2/26	2/22	2/17	2/11

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	9/19	9/23	9/26	9/28	10/01	10/03	10/06	10/09	10/13
32	9/27	10/01	10/04	10/06	10/09	10/11	10/13	10/16	10/20
28	10/04	10/10	10/13	10/17	10/20	10/23	10/26	10/30	11/04
24	10/18	10/24	10/29	11/02	11/06	11/10	11/14	11/18	11/25
20	10/30	11/05	11/10	11/13	11/17	11/20	11/24	11/28	12/04
16	11/09	11/16	11/22	11/26	11/30	12/05	12/09	12/14	12/22

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	169	162	156	152	148	143	139	134	126
32	187	180	176	172	168	164	160	156	149
28	213	205	199	194	190	185	180	175	167
24	244	236	231	226	221	216	212	206	198
20	266	258	253	248	244	239	234	229	221
16	301	291	284	279	273	268	262	255	246

***** 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	1012	761	551	267	92	6	0	4	46	251	563	895	4448
60	857	624	405	148	34	0	0	0	13	141	417	740	3379
57	765	546	321	94	15	0	0	0	5	91	335	652	2824
55	710	493	270	66	8	0	0	0	2	65	283	595	2492
50	565	370	164	20	1	0	0	0	0	23	171	453	1767
32	168	76	8	0	0	0	0	0	0	0	7	103	362

Base — Cooling Degree Days (1)

Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	179	240	480	734	1028	1228	1399	1349	1094	796	433	231	9191
55	8	13	29	110	323	538	686	636	406	148	19	10	2926
57	1	9	19	79	268	478	624	574	349	112	12	6	2531
60	0	3	9	43	194	388	531	481	267	69	4	0	1989
65	0	0	0	11	97	244	376	330	151	24	0	0	1233
70	0	0	0	1	36	121	226	193	68	6	0	0	651

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	50	102	268	503	792	1008	1172	1120	867	554	233	76	50	152	420	923	1715	2723	3895	5015	5882	6436	6669	6745
45	20	54	163	361	637	858	1017	965	717	404	142	34	20	74	237	598	1235	2093	3110	4075	4792	5196	5338	5372
50	8	21	91	234	483	708	862	810	568	268	72	16	8	29	120	354	837	1545	2407	3217	3785	4053	4125	4141
55	1	5	40	135	334	558	707	655	421	157	32	3	1	6	46	181	515	1073	1780	2435	2856	3013	3045	3048
60	0	0	8	63	199	408	552	500	286	80	13	0	0	0	8	71	270	678	1230	1730	2016	2096	2109	2109
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	36	74	180	325	519	679	795	753	574	372	151	47	36	110	290	615	1134	1813	2608	3361	3935	4307	4458	4505

(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