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: CHARLESTON, MO **COOP ID: 231540**

Climate Division: MO 6 **NWS Call Sign:** **Elevation: 330 Feet** **Lat: 36˚56N** **Lon: 89˚21W**

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	41.3	23.5	32.4	74	1952	16	45.7	1990	-18	1985	21	19.2	1977	1011	0	.0	.0	7.5	7.3	24.5	1.3
Feb	48.1	27.9	38.0	79	1986	21	44.6	1976	-2	1958	17	24.0	1978	757	0	.0	.0	12.7	3.9	19.0	.3
Mar	58.1	36.2	47.2	85+	1990	13	55.8	1990	-1	1960	5	39.8	1996	557	5	.0	.0	23.7	.4	10.6	.0
Apr	69.0	45.0	57.0	97	1952	30	62.5	1981	25+	1989	11	50.5	1983	257	17	.0	.2	29.1	.0	2.2	.0
May	78.6	54.9	66.8	98+	1953	29	73.1	1991	33	1954	7	61.2	1981	89	144	.0	1.5	31.0	.0	.0	.0
Jun	87.4	64.5	76.0	104+	1952	30	81.7	1987	46	1980	12	71.2	1974	3	332	.2	10.8	30.0	.0	.0	.0
Jul	91.4	69.0	80.2	106	1980	16	85.2	1980	51+	1990	14	77.3	1989	0	471	.9	19.2	31.0	.0	.0	.0
Aug	89.4	66.5	78.0	105	1954	16	82.7	1983	43	1986	29	73.4	1992	1	402	.6	13.9	31.0	.0	.0	.0
Sep	82.6	57.5	70.1	103	1954	5	75.8	1998	35	1967	29	64.9	1974	35	185	.1	5.0	30.0	.0	.0	.0
Oct	71.9	44.6	58.3	93+	1981	1	65.1	1971	22	1987	22	52.2	1976	243	33	.0	.2	30.7	.0	2.9	.0
Nov	58.3	37.0	47.7	87	1987	2	53.9	1990	11+	1976	30	38.5	1976	523	2	.0	.0	22.3	.1	10.7	.0
Dec	46.2	27.9	37.1	74+	1984	15	45.4	1984	-9	1983	25	25.9	2000	866	0	.0	.0	11.8	3.7	21.5	.3
Ann	68.5	46.2	57.4	106	Jul 1980	16	85.2	Jul 1980	-18	Jan 1985	21	19.2	Jan 1977	4342	1591	1.8	50.8	290.8	15.4	91.4	1.9

\+ 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: 1951-2001

(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	3.19	3.00	4.15	2000	3	7.94	2000	.22	1986
Feb	3.82	3.38	5.49	1989	14	14.20	1989	.72	1983
Mar	4.82	4.08	6.23	1964	9	18.38	1977	1.62	1971
Apr	4.73	4.68	3.16	1997	5	9.42	1983	1.50	1976
May	4.75	4.58	4.10	1983	3	11.21	1986	1.36	1994
Jun	3.96	3.96	4.79	1976	16	8.92	1998	.99	1988
Jul	4.58	4.09	3.71	2000	31	10.06	1972	.58	1991
Aug	3.24	2.73	6.50	1952	12	7.68	1986	.44	1984
Sep	2.70	2.41	5.87	1965	11	6.31	1993	.15	1999
Oct	3.20	2.57	3.45	1998	7	10.68	1984	.63	1989
Nov	4.37	4.41	4.02	1957	13	10.56	1973	1.02	1989
Dec	4.48	3.70	4.30	2001	17	13.43	1982	.56	1989
Ann	47.84	47.47	6.50	Aug 1952	12	18.38	Mar 1977	.15	Sep 1999

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	8.9	5.7	2.3	.7
Feb	7.7	5.5	2.6	1.4
Mar	9.7	7.4	2.9	1.2
Apr	10.2	7.3	3.1	1.4
May	11.0	7.6	3.2	1.1
Jun	9.5	6.4	2.3	.9
Jul	8.1	5.7	3.0	1.4
Aug	6.8	4.8	2.2	1.0
Sep	6.9	4.5	2.0	.8
Oct	7.4	5.2	2.3	.9
Nov	8.8	6.6	3.2	1.4
Dec	10.0	7.2	2.9	1.1
Ann	105.0	73.9	32.0	13.3

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	.48	.75	1.21	1.65	2.11	2.61	3.19	3.90	4.85	6.39	7.88
Feb	.88	1.24	1.80	2.30	2.80	3.33	3.93	4.64	5.57	7.06	8.45
Mar	1.39	1.84	2.53	3.13	3.71	4.32	5.00	5.79	6.82	8.43	9.92
Apr	1.43	1.88	2.55	3.13	3.69	4.27	4.92	5.67	6.64	8.16	9.57
May	1.51	1.97	2.63	3.20	3.76	4.33	4.95	5.68	6.63	8.10	9.46
Jun	1.32	1.69	2.24	2.71	3.16	3.62	4.13	4.72	5.48	6.66	7.75
Jul	1.05	1.47	2.14	2.75	3.35	3.99	4.70	5.56	6.68	8.47	10.16
Aug	.49	.76	1.23	1.68	2.15	2.66	3.24	3.96	4.92	6.49	8.00
Sep	.46	.70	1.09	1.46	1.84	2.25	2.72	3.29	4.06	5.29	6.47
Oct	.76	1.06	1.53	1.94	2.36	2.80	3.29	3.88	4.65	5.86	7.01
Nov	1.01	1.42	2.06	2.63	3.20	3.81	4.48	5.29	6.36	8.04	9.63
Dec	.88	1.29	1.95	2.55	3.16	3.81	4.56	5.45	6.63	8.53	10.33
Ann	33.02	35.86	39.51	42.29	44.77	47.18	49.67	52.42	55.78	60.66	64.89

\+ 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: 1951-2001
(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	2.4	.0	1	#
Feb	2.2	.3	#	0
Mar	1.1	.0	#	0
Apr	#	.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	.1	.0	0	0
Nov	.1	.0	#	0
Dec	.5	.0	#	0
Ann	6.4	.3	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	6.0	1985	28	17.0	1979	13	1978	17	5	1985
Feb	6.0	1986	14	11.0	1980	8	1985	2	3	1980
Mar	9.0	1994	9	9.0	1994	9	1994	10	1	1994
Apr	#	1971	5	#	1971	0	0	0	0	0
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	3.0	1993	30	3.0	1993	0	0	0	0	0
Nov	1.0	1971	23	1.0+	1976	1	1971	23	#	1971
Dec	3.5	1973	20	3.5	1973	8	1984	6	1+	2000
Ann	9.0	Mar 1994	9	17.0	Jan 1979	13	Jan 1978	17	5	Jan 1985

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	1.5	1.1	.3	.1	.0
Feb	1.3	.8	.5	.1	.0
Mar	.6	.4	.2	@	.0
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
Nov	.1	.1	.0	.0	.0
Dec	.3	.2	.1	.0	.0
Ann	3.8	2.6	1.1	.2	.0

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	2.3	1.4	.5	.0
Feb	.3	.1	.0	.0
Mar	.4	.2	.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	@	.0	.0	.0
Dec	.0	.0	.0	.0
Ann	3.0	1.7	.6	.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	4/29	4/25	4/21	4/18	4/16	4/13	4/10	4/07	4/02
32	4/19	4/15	4/11	4/08	4/06	4/03	3/31	3/28	3/23
28	4/11	4/05	4/01	3/29	3/25	3/22	3/19	3/14	3/09
24	3/26	3/19	3/14	3/10	3/06	3/02	2/26	2/22	2/15
20	3/21	3/12	3/05	2/28	2/23	2/17	2/12	2/06	1/28
16	3/09	3/01	2/23	2/18	2/14	2/09	2/04	1/29	1/21

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	9/30	10/05	10/08	10/11	10/13	10/16	10/19	10/22	10/26
32	10/06	10/12	10/16	10/20	10/23	10/27	10/30	11/04	11/10
28	10/23	10/29	11/03	11/07	11/10	11/14	11/18	11/23	11/29
24	10/31	11/06	11/11	11/16	11/20	11/24	11/28	12/03	12/10
20	11/16	11/23	11/28	12/02	12/06	12/10	12/15	12/20	12/27
16	11/22	11/29	12/04	12/09	12/13	12/17	12/22	12/27	1/03

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	200	193	188	184	180	176	171	166	159
32	221	214	208	204	200	195	191	186	179
28	256	247	240	235	229	224	218	212	202
24	285	276	269	263	258	252	246	240	230
20	320	308	300	293	286	279	272	263	251
16	333	323	315	308	302	296	289	281	270

***** 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	1011	757	557	257	89	3	0	1	35	243	523	866	4342
60	856	619	415	145	36	0	0	0	9	140	383	711	3314
57	772	542	335	94	19	0	0	0	3	93	305	621	2784
55	713	489	287	67	11	0	0	0	2	68	257	566	2460
50	571	366	185	23	2	0	0	0	0	26	158	424	1755
32	186	75	13	0	0	0	0	0	0	0	6	85	365

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	199	242	483	750	1078	1319	1494	1424	1140	813	476	241	9659
55	13	13	44	127	376	629	781	711	452	168	37	9	3360
57	9	9	30	94	322	569	719	649	394	131	25	3	2954
60	0	2	17	55	246	479	626	556	309	85	13	0	2388
65	0	0	5	17	144	332	471	402	185	33	2	0	1591
70	0	0	0	3	70	196	316	255	91	9	0	0	940

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	53	110	276	531	840	1077	1231	1157	898	577	267	83	53	163	439	970	1810	2887	4118	5275	6173	6750	7017	7100
45	27	55	171	388	685	927	1076	1002	748	424	166	41	27	82	253	641	1326	2253	3329	4331	5079	5503	5669	5710
50	4	21	94	259	530	777	921	847	598	284	94	14	4	25	119	378	908	1685	2606	3453	4051	4335	4429	4443
55	0	5	44	152	377	627	766	692	451	171	46	4	0	5	49	201	578	1205	1971	2663	3114	3285	3331	3335
60	0	1	12	74	239	477	611	537	310	88	14	0	0	1	13	87	326	803	1414	1951	2261	2349	2363	2363
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	28	71	165	323	540	734	842	795	595	369	160	47	28	99	264	587	1127	1861	2703	3498	4093	4462	4622	4669

(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