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: CASSVILLE RANGER STN, MO **COOP ID: 231383**

Climate Division: MO 4 **NWS Call Sign:** **Elevation: 1,340 Feet** **Lat: 36˚40N** **Lon: 93˚51W**

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	42.3	20.4	31.4	75	1986	21	40.5	1990	-19	1984	19	18.6	1977	1044	0	.0	.0	9.9	6.9	27.7	2.0
Feb	48.5	24.4	36.5	82	1918	9	45.7	1976	-22	1996	4	25.3	1978	800	0	.0	.0	14.4	4.0	22.4	1.1
Mar	57.7	33.6	45.7	86+	1995	23	50.0	1973	-2	1980	2	39.5	1996	601	0	.0	.0	22.7	.6	15.5	@
Apr	67.7	42.1	54.9	90+	1987	20	61.4	1981	17+	1989	11	49.6	1983	310	7	.0	.1	28.2	.0	5.4	.0
May	75.2	51.7	63.5	92	1918	8	68.7	1987	26	1963	1	57.9	1976	128	79	.0	@	31.0	.0	.4	.0
Jun	83.0	60.3	71.7	101+	1988	27	75.6	1980	37	1972	1	67.8	1982	15	214	.1	3.3	30.0	.0	.0	.0
Jul	88.1	65.0	76.6	106	1980	31	82.7	1980	41	1918	1	73.4	1996	0	358	.6	12.7	31.0	.0	.0	.0
Aug	88.1	62.9	75.5	106	1964	5	82.0	1980	41+	1919	31	69.3	1992	7	333	.7	13.1	31.0	.0	.0	.0
Sep	80.1	55.5	67.8	102	1998	5	74.0	1980	29	1967	29	61.4	1974	66	149	.3	4.0	30.0	.0	.3	.0
Oct	70.0	42.9	56.5	96	1919	3	61.1	1971	19	1980	30	51.2	1987	276	11	.0	.1	30.2	.0	5.4	.0
Nov	56.9	33.5	45.2	83+	1980	9	53.5	1999	2	1976	29	38.1	1976	595	0	.0	.0	21.3	.6	15.3	.0
Dec	46.2	24.1	35.2	78	1970	1	42.1	1984	-15	1989	23	20.0	1983	926	0	.0	.0	13.1	3.9	24.8	.9
Ann	67.0	43.0	55.0	106+	Jul 1980	31	82.7	Jul 1980	-22	Feb 1996	4	18.6	Jan 1977	4768	1151	1.7	33.3	292.8	16.0	117.2	4.0

\+ 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: 1918-2001

(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	2.06	1.66	3.55	1982	30	5.82	1990	.00	1986
Feb	2.41	2.13	2.90	2001	26	6.50	1990	.28	1982
Mar	4.24	3.99	3.32	1989	5	8.46	1973	1.08	1971
Apr	4.65	4.45	3.75	1965	3	9.36	1983	.15	1989
May	4.86	4.29	5.41	1956	15	15.39	1990	1.10	1994
Jun	4.85	4.64	5.97	2000	19	12.52	2000	.56	1984
Jul	3.50	2.97	5.23	1993	6	9.25	1976	.33	1974
Aug	3.40	3.37	3.91	1981	3	8.20	1981	.34	1995
Sep	4.61	3.85	5.05	1986	30	11.41	1993	.39	1981
Oct	3.29	3.05	2.55	1969	13	8.89	1984	.76	1999
Nov	4.43	4.34	4.10	1994	7	8.65	1996	.40	1989
Dec	3.53	2.82	4.78	1982	3	8.90	1984	.52	1989
Ann	45.83	44.41	5.97	Jun 2000	19	15.39	May 1990	.00	Jan 1986

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	6.0	4.1	1.4	.4
Feb	6.6	4.3	1.5	.7
Mar	8.8	6.4	3.2	1.4
Apr	8.9	6.3	2.8	1.3
May	10.4	7.7	3.6	1.2
Jun	8.5	6.6	2.9	1.3
Jul	6.4	5.2	2.1	1.0
Aug	6.5	4.7	2.1	1.0
Sep	7.7	5.4	2.7	1.5
Oct	7.6	5.2	2.5	1.1
Nov	7.2	5.5	2.9	1.7
Dec	6.5	4.5	2.1	1.1
Ann	91.1	65.9	29.8	13.7

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	.23	.48	.82	1.12	1.42	1.75	2.11	2.55	3.13	4.06	4.94
Feb	.57	.80	1.15	1.46	1.78	2.11	2.48	2.92	3.50	4.41	5.27
Mar	1.29	1.69	2.29	2.81	3.31	3.84	4.41	5.09	5.96	7.32	8.58
Apr	1.04	1.47	2.16	2.77	3.38	4.03	4.77	5.64	6.80	8.63	10.36
May	1.64	2.10	2.77	3.34	3.89	4.45	5.07	5.79	6.71	8.14	9.45
Jun	1.16	1.61	2.32	2.95	3.58	4.25	4.99	5.88	7.04	8.88	10.62
Jul	.67	.99	1.50	1.98	2.46	2.97	3.56	4.27	5.21	6.72	8.15
Aug	.63	.93	1.43	1.89	2.37	2.87	3.45	4.15	5.07	6.56	7.98
Sep	.92	1.34	2.02	2.64	3.27	3.94	4.70	5.62	6.83	8.77	10.61
Oct	.88	1.19	1.67	2.08	2.49	2.93	3.40	3.97	4.71	5.87	6.95
Nov	.93	1.33	1.98	2.57	3.17	3.81	4.53	5.39	6.53	8.35	10.08
Dec	.67	.98	1.50	1.98	2.46	2.99	3.58	4.30	5.25	6.78	8.23
Ann	32.90	35.42	38.63	41.07	43.24	45.33	47.49	49.87	52.76	56.94	60.55

\+ 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: 1918-2001
(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	2.7	1.0	#	0	11.0	1995	19	11.0	1995	11	1995	19	3	1977	1.3	1.0	.6	.2	.1	2.7	1.1	.3	.0
Feb	2.9	1.8	#	#	6.0	1975	24	10.5	1975	14	1984	27	3	1993	1.3	.9	.3	.1	.0	1.8	1.1	.4	.1
Mar	1.6	.0	#	0	23.0	1999	15	23.0	1999	18	1994	9	2	1994	.7	.6	.2	.1	.1	1.0	.6	.4	.2
Apr	.3	.0	#	0	7.5	1971	5	7.5	1971	8	1971	5	#	1971	@	@	@	@	.0	.1	.1	.1	.0
May	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Jun	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.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	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Sep	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Oct	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Nov	.5	.0	#	0	6.0	1980	18	6.0	1980	4	1975	26	#+	1991	.2	.2	.2	@	.0	.1	.1	.0	.0
Dec	1.7	.0	#	0	6.0	1985	13	7.0	1985	6	1985	13	2	1983	.8	.6	.3	.1	.0	1.6	1.2	.3	.0
Ann	9.7	2.8	N/A	N/A	23.0	Mar 1999	15	23.0	Mar 1999	18	Mar 1994	9	3+	Feb 1993	4.3	3.3	1.6	.5	.2	7.3	4.2	1.5	.3

+ 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	5/18	5/13	5/09	5/05	5/02	4/29	4/26	4/22	4/16
32	5/08	5/03	4/29	4/26	4/23	4/20	4/17	4/14	4/09
28	4/23	4/19	4/15	4/12	4/10	4/07	4/04	4/01	3/27
24	4/13	4/09	4/05	4/03	3/31	3/28	3/25	3/22	3/17
20	4/04	3/28	3/23	3/19	3/15	3/11	3/07	3/02	2/23
16	3/22	3/15	3/10	3/06	3/03	2/27	2/23	2/18	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	9/20	9/24	9/27	9/29	10/01	10/04	10/06	10/09	10/13
32	9/25	9/30	10/04	10/07	10/10	10/13	10/16	10/19	10/24
28	10/09	10/14	10/18	10/21	10/24	10/27	10/30	11/03	11/08
24	10/18	10/25	10/30	11/03	11/07	11/10	11/14	11/19	11/26
20	11/01	11/06	11/11	11/14	11/17	11/21	11/24	11/29	12/04
16	11/10	11/17	11/22	11/27	12/01	12/05	12/09	12/14	12/21

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	172	165	160	156	152	148	143	138	132
32	187	181	176	172	169	165	161	157	150
28	217	210	205	201	197	193	189	184	177
24	242	234	229	224	220	216	211	206	199
20	271	263	257	251	247	242	236	230	222
16	297	289	282	277	272	268	262	256	248

***** 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	1044	800	601	310	128	15	0	7	66	276	595	926	4768
60	889	660	448	184	57	2	0	1	23	154	451	771	3640
57	796	582	363	124	30	0	0	0	10	97	368	684	3054
55	738	530	308	90	18	0	0	0	6	68	316	627	2701
50	595	403	190	32	4	0	0	0	0	22	203	485	1934
32	189	90	9	0	0	0	0	0	0	0	14	123	425

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	168	214	431	687	974	1189	1381	1349	1073	759	410	220	8855
55	5	10	17	87	279	499	668	636	388	114	21	11	2735
57	0	6	10	61	229	440	606	574	333	81	14	5	2359
60	0	0	3	31	163	352	513	482	256	44	6	0	1850
65	0	0	0	7	79	214	358	333	149	11	0	0	1151
70	0	0	0	1	28	104	211	199	73	2	0	0	618

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	44	99	250	459	734	962	1139	1104	838	524	219	70	44	143	393	852	1586	2548	3687	4791	5629	6153	6372	6442
45	18	50	154	324	579	812	984	949	688	375	134	34	18	68	222	546	1125	1937	2921	3870	4558	4933	5067	5101
50	1	21	86	207	428	662	829	794	540	242	68	13	1	22	108	315	743	1405	2234	3028	3568	3810	3878	3891
55	0	4	41	116	287	512	674	639	398	139	31	1	0	4	45	161	448	960	1634	2273	2671	2810	2841	2842
60	0	0	12	55	164	364	519	484	269	63	8	0	0	0	12	67	231	595	1114	1598	1867	1930	1938	1938
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	43	84	174	299	466	652	774	738	552	345	147	58	43	127	301	600	1066	1718	2492	3230	3782	4127	4274	4332

(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