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: HOUSTON 1 NE, MO **COOP ID: 234019**

Climate Division: MO 5 **NWS Call Sign:** **Elevation: 1,293 Feet** **Lat: 37˚20N** **Lon: 91˚57W**

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	40.8	19.6	30.2	75+	1967	24	41.2	1990	-22	1977	11	15.5	1977	1080	0	.0	.0	8.5	8.2	27.0	2.5
Feb	47.2	24.4	35.8	85	1962	14	44.2	1976	-11	1985	3	22.8	1978	818	0	.0	.0	12.4	4.7	21.2	1.4
Mar	57.3	33.4	45.4	87	1967	14	51.0	1973	-9	1960	5	37.7	1996	610	0	.0	.0	22.8	.7	15.2	.1
Apr	67.9	42.3	55.1	92	2001	10	61.0	1981	17	1962	3	48.0	1997	310	13	.0	.1	28.2	.0	6.1	.0
May	75.5	51.8	63.7	94+	2001	18	69.1	1991	26	1961	2	58.1	1976	135	93	.0	.2	31.0	.0	.6	.0
Jun	82.9	60.7	71.8	102+	1954	26	78.7	1988	35	1972	1	66.9	1974	16	220	@	3.8	30.0	.0	.0	.0
Jul	88.4	64.5	76.5	109+	1980	14	83.3	1980	42	1972	6	72.8	1994	0	354	.8	15.1	31.0	.0	.0	.0
Aug	87.2	62.6	74.9	107	1980	1	81.6	1980	38	1967	27	68.6	1992	10	316	1.1	12.6	31.0	.0	.0	.0
Sep	79.4	54.6	67.0	104	1954	3	73.4	1998	27+	1995	24	60.3	1974	73	134	.2	4.0	30.0	.0	.3	.0
Oct	69.2	43.0	56.1	95	1953	1	62.7	2000	18+	1981	26	49.7	1988	293	17	.0	.3	30.1	.0	6.1	.0
Nov	55.8	33.2	44.5	90	1987	1	51.7	1990	0	1951	8	35.8	1976	615	0	.0	@	20.6	.6	15.2	.0
Dec	44.6	23.7	34.2	76+	1971	27	41.9	1984	-18	1983	27	19.8	1983	956	0	.0	.0	10.6	5.0	25.2	1.1
Ann	66.4	42.8	54.6	109+	Jul 1980	14	83.3	Jul 1980	-22	Jan 1977	11	15.5	Jan 1977	4916	1147	2.1	36.1	286.2	19.2	116.9	5.1

\+ 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: 1951-2001

(3) Derived from 1971-2000 serially complete daily data

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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	2.08	1.77	3.55	1982	31	5.25	1982	.02	1986
Feb	2.48	2.16	3.50	1999	6	7.39	1985	.13	1996
Mar	3.95	3.44	3.80	1977	28	8.92	1973	.17	1995
Apr	4.49	3.98	5.67	1983	30	10.83	1994	.66	2000
May	4.65	4.21	5.30	1956	31	15.06	1990	1.18	1977
Jun	3.77	3.34	2.92	1974	8	11.84	1998	.47	1988
Jul	3.50	3.01	4.90	1979	28	9.13	1979	.09	1985
Aug	3.58	3.43	4.15	1970	6	13.32	1974	.45	1994
Sep	3.81	3.09	3.74	1993	25	11.97	1993	.45	1982
Oct	3.58	3.54	3.95	1998	5	6.76	1983	.86	1992
Nov	4.31	3.64	5.30	1983	4	11.48	1983	.38	1976
Dec	3.25	2.90	4.01	1957	17	9.92	1987	.66	1980
Ann	43.45	43.17	5.67	Apr 1983	30	15.06	May 1990	.02	Jan 1986

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	5.8	3.9	1.3	.5
Feb	5.4	3.6	1.6	.6
Mar	8.0	6.0	2.8	.9
Apr	8.6	6.4	2.7	1.4
May	8.2	6.2	3.2	1.2
Jun	8.1	6.2	2.6	1.0
Jul	6.6	5.1	2.4	1.2
Aug	6.0	4.7	2.2	1.2
Sep	6.3	5.0	2.8	1.4
Oct	5.6	4.4	2.4	1.3
Nov	6.4	5.0	2.7	1.2
Dec	6.2	4.3	2.2	.9
Ann	81.2	60.8	28.9	12.8

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	.23	.39	.68	.97	1.28	1.63	2.04	2.54	3.23	4.37	5.48
Feb	.30	.50	.85	1.20	1.56	1.97	2.44	3.03	3.82	5.13	6.40
Mar	.78	1.14	1.72	2.25	2.79	3.37	4.02	4.81	5.85	7.51	9.10
Apr	1.14	1.56	2.21	2.79	3.36	3.96	4.63	5.43	6.46	8.10	9.64
May	1.26	1.70	2.37	2.96	3.53	4.14	4.81	5.60	6.64	8.25	9.77
Jun	.84	1.19	1.74	2.24	2.74	3.27	3.87	4.58	5.52	7.01	8.42
Jul	.49	.78	1.28	1.77	2.28	2.84	3.48	4.28	5.35	7.09	8.78
Aug	.89	1.22	1.74	2.20	2.66	3.15	3.68	4.32	5.16	6.49	7.73
Sep	.61	.94	1.49	2.02	2.56	3.15	3.83	4.65	5.76	7.55	9.27
Oct	1.26	1.59	2.08	2.50	2.89	3.29	3.74	4.25	4.91	5.92	6.86
Nov	.68	1.05	1.68	2.27	2.89	3.56	4.32	5.26	6.51	8.55	10.50
Dec	.65	.94	1.42	1.86	2.30	2.78	3.31	3.96	4.82	6.19	7.49
Ann	28.01	30.89	34.63	37.52	40.11	42.64	45.27	48.20	51.78	57.04	61.64

\+ 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	.6	.0	#	0
Feb	.1	.0	#	0
Mar	.0	.0	#	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
Dec	.8	#	#	0
Ann	1.5	#	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	4.0	1988	7	4.0	1988	6	2000	29	1+	2000
Feb	1.0	1999	19	1.0+	1999	1	1999	19	#	1999
Mar	.0	0	0	.0	0	11	1999	13	1	1999
Apr	.0	0	0	.0	0	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	.0	0	0	.0	0	0	0	0	0	0
Nov	#	2000	10	#+	2000	#	2000	10	#	2000
Dec	6.0	2000	12	6.0+	2000	11	2000	13	4	2000
Ann	6.0	Dec 2000	12	6.0+	Dec 2000	11+	Dec 2000	13	4	Dec 2000

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	.6	.6	.2	.0	.0
Feb	.1	.1	.0	.0	.0
Mar	.0	.0	.0	.0	.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	.0	.0	.0
Nov	.0	.0	.0	.0	.0
Dec	.6	.6	.2	.2	.0
Ann	1.3	1.3	.4	.2	.0

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	.5	.3	.0	.0
Feb	.1	.0	.0	.0
Mar	.0	.0	.0	.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	.0
Dec	.1	.0	.0	.0
Ann	.7	.3	.0	.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	5/22	5/16	5/13	5/09	5/06	5/03	4/30	4/26	4/21
32	5/08	5/03	4/29	4/26	4/24	4/21	4/18	4/14	4/09
28	4/25	4/20	4/16	4/13	4/10	4/07	4/04	3/31	3/26
24	4/15	4/09	4/05	4/02	3/29	3/26	3/22	3/18	3/13
20	4/04	3/30	3/26	3/23	3/20	3/18	3/14	3/11	3/06
16	3/24	3/16	3/10	3/05	2/28	2/24	2/19	2/13	2/05

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	9/25	9/28	9/30	10/02	10/04	10/07	10/10
32	9/27	10/01	10/03	10/05	10/07	10/09	10/12	10/14	10/18
28	9/28	10/05	10/10	10/14	10/18	10/22	10/26	10/31	11/07
24	10/19	10/25	10/29	11/01	11/05	11/08	11/11	11/16	11/21
20	10/28	11/03	11/08	11/12	11/15	11/19	11/23	11/28	12/04
16	11/10	11/16	11/20	11/24	11/28	12/02	12/05	12/10	12/16

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	164	158	153	149	146	142	138	134	127
32	184	178	174	170	166	162	159	154	148
28	216	207	201	195	190	185	180	173	164
24	243	235	229	224	220	215	210	204	196
20	261	254	248	244	239	235	230	225	217
16	301	291	284	278	272	266	260	253	242

***** 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	1080	818	610	310	135	16	0	10	73	293	615	956	4916
60	925	679	464	190	64	3	0	1	27	175	471	801	3800
57	832	602	379	132	36	1	0	0	12	119	388	710	3211
55	774	549	326	100	23	0	0	0	7	88	336	653	2856
50	631	423	212	41	7	0	0	0	1	36	220	510	2081
32	217	106	16	0	0	0	0	0	0	0	16	134	489

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	160	212	429	694	982	1194	1377	1330	1051	747	392	200	8768
55	5	11	26	103	292	504	664	617	368	123	21	7	2741
57	1	8	17	76	243	445	602	555	313	91	13	2	2366
60	0	1	9	43	178	357	509	463	238	54	6	0	1858
65	0	0	0	13	93	220	354	316	134	17	0	0	1147
70	0	0	0	3	38	110	209	187	63	4	0	0	614

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	43	95	240	455	745	968	1148	1106	835	512	217	66	43	138	378	833	1578	2546	3694	4800	5635	6147	6364	6430
45	15	48	148	318	590	818	993	951	685	369	130	30	15	63	211	529	1119	1937	2930	3881	4566	4935	5065	5095
50	2	17	77	206	436	668	838	796	538	236	66	12	2	19	96	302	738	1406	2244	3040	3578	3814	3880	3892
55	0	5	35	115	294	518	683	641	394	138	29	0	0	5	40	155	449	967	1650	2291	2685	2823	2852	2852
60	0	0	12	55	169	370	528	486	266	63	9	0	0	0	12	67	236	606	1134	1620	1886	1949	1958	1958
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	35	71	164	294	477	655	775	742	544	336	145	50	35	106	270	564	1041	1696	2471	3213	3757	4093	4238	4288

(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