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: MT VERNON M U SW CTR, MO **COOP ID: 235862**

Climate Division: MO 4 **NWS Call Sign:** **Elevation: 1,190 Feet** **Lat: 37˚04N** **Lon: 93˚53W**

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	42.2	17.6	29.9	74	1986	21	40.1	1990	-16	1985	20	15.7	1979	1087	0	.0	.0	9.1	7.9	27.2	2.1
Feb	48.3	23.1	35.7	83	1962	12	45.9	1976	-18	1979	9	22.9	1978	820	0	.0	.0	12.4	4.9	20.9	1.1
Mar	57.7	32.5	45.1	85	1995	23	49.9	1973	1+	1998	12	38.2	1975	617	0	.0	.0	21.8	1.0	13.8	.0
Apr	67.2	41.6	54.4	89	1972	13	61.6	1981	18	1975	3	48.4	1983	326	8	.0	.0	28.1	.0	4.5	.0
May	75.3	51.4	63.4	92+	1987	22	69.6	1987	29+	1997	1	58.4	1976	130	79	.0	.2	30.9	.0	.4	.0
Jun	83.8	60.1	72.0	100	1988	25	76.2	1994	38	2000	6	67.4	1982	18	227	@	4.5	30.0	.0	.0	.0
Jul	90.1	64.6	77.4	106+	1986	30	84.7	1980	43	1997	5	73.9	1979	0	381	.9	15.3	31.0	.0	.0	.0
Aug	90.0	62.5	76.3	105	1999	13	83.2	1980	44+	1997	7	70.0	1992	7	355	1.3	14.5	31.0	.0	.0	.0
Sep	81.4	54.5	68.0	106	2000	3	74.8	1998	28	1995	23	61.5	1974	68	157	.4	4.7	30.0	.0	.2	.0
Oct	70.9	42.8	56.9	93	1963	7	61.9	2000	16	1993	31	51.1	1976	268	15	.0	.1	29.9	.0	3.9	.0
Nov	57.1	32.3	44.7	82+	1999	15	52.6	1999	4+	1976	29	37.2	1976	609	0	.0	.0	20.4	.7	13.9	.0
Dec	46.3	22.3	34.3	75+	1998	6	41.4	1984	-17	1989	23	18.6	1983	952	0	.0	.0	11.9	4.7	23.9	.9
Ann	67.5	42.1	54.8	106+	Sep 2000	3	84.7	Jul 1980	-18	Feb 1979	9	15.7	Jan 1979	4902	1222	2.6	39.3	286.5	19.2	108.7	4.1

\+ 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: 1961-2001

(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	1.90	1.53	2.10	1996	18	5.04	1982	.07	1986
Feb	1.94	1.80	2.48	1985	23	4.54	1990	.28	1996
Mar	3.77	3.48	3.47	1985	30	9.64	1973	1.23	1971
Apr	4.09	3.90	3.50	1970	30	9.13	1994	.30	1989
May	4.71	4.33	4.82	1979	20	14.38	1990	1.84	1994
Jun	5.38	4.98	3.80	1963	15	11.41	1981	.98	1984
Jul	3.41	2.95	4.47	1983	4	7.73	1989	.20	1980
Aug	3.94	3.21	3.83	1988	23	10.36	1982	.31	2000
Sep	5.36	4.31	8.20	1993	25	17.93	1993	1.01	1982
Oct	3.46	3.18	4.06	1983	20	7.89	1981	.53	1999
Nov	4.49	3.66	4.78	1987	25	10.84	1992	.10	1989
Dec	2.94	2.58	2.76	1973	4	6.93	1987	.37	1989
Ann	45.39	45.13	8.20	Sep 1993	25	17.93	Sep 1993	.07	Jan 1986

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	8.1	4.1	1.0	.4
Feb	7.0	4.1	1.2	.4
Mar	10.2	6.5	2.7	.9
Apr	11.0	6.2	2.7	1.3
May	12.1	7.3	3.2	1.3
Jun	10.6	7.7	3.3	1.9
Jul	7.7	5.0	2.2	1.0
Aug	8.1	5.3	2.5	1.3
Sep	9.2	6.3	3.3	1.7
Oct	8.9	5.7	2.4	.8
Nov	8.6	5.6	2.9	1.7
Dec	8.1	4.8	2.3	.8
Ann	109.6	68.6	29.7	13.5

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	.27	.42	.70	.96	1.24	1.54	1.89	2.32	2.91	3.86	4.77
Feb	.42	.60	.88	1.14	1.40	1.67	1.98	2.35	2.84	3.62	4.35
Mar	1.10	1.46	1.99	2.46	2.91	3.39	3.91	4.52	5.32	6.57	7.73
Apr	1.10	1.49	2.08	2.60	3.11	3.64	4.23	4.93	5.85	7.29	8.63
May	1.59	2.04	2.69	3.24	3.77	4.32	4.92	5.61	6.51	7.89	9.17
Jun	1.57	2.09	2.85	3.52	4.17	4.84	5.59	6.46	7.60	9.37	11.02
Jul	.57	.86	1.36	1.83	2.31	2.84	3.44	4.16	5.14	6.71	8.22
Aug	.70	1.05	1.62	2.16	2.71	3.30	3.98	4.80	5.89	7.66	9.34
Sep	1.19	1.68	2.47	3.18	3.89	4.64	5.49	6.51	7.85	9.98	11.99
Oct	.69	1.00	1.51	1.97	2.44	2.95	3.52	4.21	5.12	6.58	7.96
Nov	.58	.94	1.58	2.20	2.86	3.59	4.44	5.48	6.90	9.21	11.46
Dec	.58	.85	1.28	1.68	2.08	2.50	2.99	3.57	4.35	5.59	6.76
Ann	32.69	35.16	38.31	40.70	42.82	44.87	46.98	49.31	52.14	56.23	59.76

\+ 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: 1961-2001
(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	4.7	1.5	1	#
Feb	3.2	1.5	#	#
Mar	2.4	.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	.8	.0	#	0
Dec	2.5	.7	#	#
Ann	13.6	3.7	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	9.0	1997	9	17.5	1979	14	1995	19	3	1997
Feb	13.0	1980	8	15.0	1980	10	1993	16	2	1993
Mar	18.0	1999	14	18.0	1999	15	1999	15	2	1989
Apr	1.0	1973	9	1.0	1973	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	5.0	1972	19	5.0+	1975	5	1975	26	#+	2000
Dec	10.5	2000	13	10.8	1983	11	2000	15	5	2000
Ann	18.0	Mar 1999	14	18.0	Mar 1999	15	Mar 1999	15	5	Dec 2000

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	2.0	1.5	.5	.1	.0
Feb	1.3	.9	.4	.2	.1
Mar	.9	.5	.2	.1	@
Apr	@	@	.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	.2	.2	.1	.1	.0
Dec	1.6	1.1	.3	@	@
Ann	6.0	4.2	1.5	.5	.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	3.9	2.2	.1	.0
Feb	2.3	1.1	.6	.1
Mar	.9	.4	.2	.1
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	.3	.1	@	.0
Dec	2.5	1.4	.7	.1
Ann	9.9	5.2	1.6	.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	5/17	5/12	5/08	5/05	5/02	4/29	4/25	4/21	4/16
32	5/06	5/01	4/27	4/24	4/21	4/18	4/15	4/11	4/06
28	4/20	4/16	4/13	4/10	4/07	4/05	4/02	3/30	3/25
24	4/12	4/06	4/02	3/30	3/26	3/23	3/19	3/15	3/10
20	3/31	3/25	3/21	3/17	3/14	3/11	3/07	3/03	2/25
16	3/20	3/13	3/08	3/03	2/27	2/23	2/19	2/14	2/07

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	9/23	9/27	9/29	10/01	10/03	10/05	10/08	10/10	10/14
32	9/26	10/02	10/06	10/09	10/12	10/16	10/19	10/23	10/28
28	10/08	10/14	10/19	10/23	10/27	10/30	11/03	11/08	11/14
24	10/20	10/27	10/31	11/04	11/08	11/12	11/16	11/21	11/28
20	11/03	11/09	11/14	11/18	11/22	11/25	11/29	12/04	12/10
16	11/09	11/16	11/21	11/26	11/30	12/04	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	174	167	162	158	154	150	146	141	134
32	198	190	184	179	174	169	164	158	149
28	221	214	210	205	201	198	193	188	182
24	256	246	239	232	226	220	214	207	196
20	278	269	263	257	252	247	241	234	225
16	304	294	287	281	275	269	263	256	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	1087	820	617	326	130	18	0	7	68	268	609	952	4902
60	932	683	465	199	59	4	0	1	25	150	463	797	3778
57	840	605	379	137	31	1	0	0	12	95	381	709	3190
55	780	553	324	103	19	0	0	0	6	67	327	652	2831
50	638	427	203	40	4	0	0	0	0	22	212	510	2056
32	219	112	12	0	0	0	0	0	0	0	16	140	499

Base — Cooling Degree Days (1)

Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	155	216	417	672	971	1199	1404	1371	1079	771	397	211	8863
55	3	13	16	84	277	509	691	658	396	125	19	11	2802
57	1	9	10	59	227	450	629	596	341	91	12	5	2430
60	0	3	3	31	162	363	536	504	264	52	4	0	1922
65	0	0	0	8	79	227	381	355	157	15	0	0	1222
70	0	0	0	1	28	119	235	220	80	3	0	0	686

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	45	108	259	465	749	980	1176	1142	857	548	234	78	45	153	412	877	1626	2606	3782	4924	5781	6329	6563	6641
45	18	57	160	330	594	830	1021	987	708	404	141	38	18	75	235	565	1159	1989	3010	3997	4705	5109	5250	5288
50	4	27	92	214	442	680	866	832	561	272	78	13	4	31	123	337	779	1459	2325	3157	3718	3990	4068	4081
55	0	6	42	122	296	531	711	677	419	167	36	1	0	6	48	170	466	997	1708	2385	2804	2971	3007	3008
60	0	1	17	61	175	383	556	522	291	83	9	0	0	1	18	79	254	637	1193	1715	2006	2089	2098	2098
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	37	82	164	289	472	663	802	765	565	349	144	57	37	119	283	572	1044	1707	2509	3274	3839	4188	4332	4389

(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