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: ANN ARBOR UNIV OF MICH, MI **COOP ID: 200230**

Climate Division: MI10 **NWS Call Sign:** **Elevation: 900 Feet** **Lat: 42˚18N** **Lon: 83˚43W**

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	30.1	16.6	23.4	72	1950	25	32.8	1990	-22	1994	19	12.1	1977	1292	0	.0	.0	1.4	17.7	29.0	2.8
Feb	33.9	18.9	26.4	67	1999	11	35.7	1998	-21	1912	10	15.4	1978	1081	0	.0	.0	2.2	12.9	25.3	1.9
Mar	45.2	27.0	36.1	83	1910	24	44.9	1973	-5	1900	17	28.4	1984	896	0	.0	.0	10.6	4.0	22.9	.2
Apr	58.0	37.3	47.7	88	1899	29	52.9	1985	7	1982	7	40.9	1975	522	1	.0	.0	23.7	.2	9.4	.0
May	70.5	48.3	59.4	95	1911	27	65.5	1998	20	1908	5	51.7	1997	227	53	.0	.2	30.7	.0	.6	.0
Jun	79.2	57.6	68.4	103	1934	28	73.1	1971	35	1913	10	64.4	1985	39	139	@	2.1	30.0	.0	.0	.0
Jul	83.0	62.1	72.6	105	1934	24	76.2	1988	43+	1918	31	68.4	1992	4	238	.1	4.7	31.0	.0	.0	.0
Aug	80.7	60.7	70.7	104	1918	6	76.2	1995	39+	1915	31	66.3	1992	17	193	.0	1.9	31.0	.0	.0	.0
Sep	73.5	53.2	63.4	99	1913	2	68.3	1998	27	1899	30	57.6	1975	107	58	.0	.8	30.0	.0	.1	.0
Oct	61.1	42.1	51.6	91	1897	1	61.0	1971	20+	1907	24	45.4	1988	424	9	.0	.0	27.3	.0	3.9	.0
Nov	46.8	32.4	39.6	78	1950	1	45.4	1975	1	1950	24	32.5	1976	762	0	.0	.0	12.5	2.0	16.1	.0
Dec	34.7	22.3	28.5	67+	1998	6	36.6	1982	-12+	1960	22	17.6	1989	1132	0	.0	.0	2.6	11.8	27.1	1.1
Ann	58.1	39.9	49.0	105	Jul 1934	24	76.2+	Aug 1995	-22	Jan 1994	19	12.1	Jan 1977	6503	691	.1	9.7	233.0	48.6	134.4	6.0

\+ 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: 1897-2001

(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	2.24	2.18	1.65	1978	26	5.01	1999	.62	1981
Feb	2.04	1.76	2.32	1918	19	6.20	1990	.17	1987
Mar	2.78	2.42	2.35	1954	25	5.07	1998	1.01	1981
Apr	3.36	3.43	2.35	1956	29	5.52	1983	.74	1971
May	2.97	2.91	2.59	1943	11	5.58	2000	1.01	1988
Jun	3.38	3.27	3.29	1968	26	7.30	2000	.60	1988
Jul	3.16	2.91	2.85	1951	22	6.27	1973	.43	1974
Aug	3.71	3.32	4.54	1998	6	8.74	1975	.27	1976
Sep	3.38	2.98	3.94	1971	27	7.03	1986	.26	1979
Oct	2.50	2.48	2.85	1954	4	4.19	1990	.54	1974
Nov	2.99	3.05	2.29	1919	29	5.86	1982	.82	1976
Dec	2.84	2.82	2.15	1967	21	4.85	2000	.91	1976
Ann	35.35	35.84	4.54	Aug 1998	6	8.74	Aug 1975	.17	Feb 1987

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	15.8	6.1	1.0	.2
Feb	12.6	5.1	1.0	.2
Mar	13.7	6.5	1.6	.3
Apr	13.7	7.9	1.9	.5
May	12.1	6.6	2.1	.5
Jun	11.1	6.8	2.4	.6
Jul	10.7	6.4	2.1	.6
Aug	10.7	6.6	2.4	1.0
Sep	10.6	6.3	2.5	.6
Oct	11.8	5.3	1.6	.5
Nov	13.8	7.2	1.7	.4
Dec	15.9	7.4	1.7	.3
Ann	152.5	78.2	22.0	5.7

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	.73	.94	1.25	1.52	1.78	2.05	2.34	2.68	3.12	3.80	4.44
Feb	.45	.63	.93	1.20	1.47	1.76	2.09	2.48	2.99	3.81	4.58
Mar	1.25	1.50	1.84	2.12	2.38	2.64	2.92	3.24	3.64	4.25	4.80
Apr	1.60	1.89	2.29	2.61	2.91	3.21	3.52	3.88	4.33	5.02	5.63
May	1.19	1.46	1.85	2.17	2.48	2.78	3.12	3.50	3.99	4.73	5.41
Jun	1.30	1.61	2.06	2.44	2.79	3.15	3.54	4.00	4.57	5.46	6.27
Jul	.77	1.07	1.53	1.94	2.35	2.78	3.26	3.83	4.58	5.77	6.88
Aug	.58	.89	1.43	1.94	2.47	3.05	3.72	4.53	5.61	7.38	9.07
Sep	1.01	1.33	1.81	2.22	2.63	3.04	3.51	4.05	4.75	5.85	6.87
Oct	1.06	1.29	1.60	1.86	2.11	2.35	2.62	2.93	3.31	3.90	4.43
Nov	1.09	1.37	1.77	2.11	2.43	2.77	3.13	3.54	4.08	4.90	5.66
Dec	1.29	1.54	1.89	2.17	2.43	2.69	2.98	3.30	3.70	4.31	4.86
Ann	27.10	28.75	30.83	32.39	33.77	35.09	36.44	37.93	39.72	42.30	44.51

\+ 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: 1897-2001
(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	13.8	11.0	4	4	11.6	1978	26	34.3	1978	20	1978	26	11	1999	13.9	4.6	1.0	.4	@	20.8	14.9	11.1	2.1
Feb	10.3	9.7	4	3	7.8	1981	10	23.5	1988	19	1982	5	17	1978	10.1	3.3	.8	.3	.0	17.5	12.3	8.1	3.0
Mar	7.9	6.6	1	1	12.4	1973	17	18.8	1993	22	1980	10	8	1978	7.7	2.2	.7	.4	@	6.1	3.6	1.9	.9
Apr	2.5	1.8	#	#	7.7	1982	6	9.1	1982	6	1982	6	1	1982	2.5	.7	.2	.1	.0	.7	.4	.1	.0
May	#	.0	0	0	#	1996	12	#+	1996	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	#	1980	29	#	1980	.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	.3	.0	#	0	2.4	1989	19	2.8	1989	1	1989	19	#+	1997	.4	.1	.0	.0	.0	@	.0	.0	.0
Nov	3.8	3.8	#	#	6.0	1972	14	9.7	1972	14	1979	29	8	1979	4.7	1.2	.2	@	.0	2.1	.5	.1	.0
Dec	13.5	11.9	2	2	15.8	1974	1	40.5	2000	16+	2000	31	10	2000	11.7	4.3	1.1	.4	@	14.0	7.5	4.3	1.0
Ann	52.1	44.8	N/A	N/A	15.8	Dec 1974	1	40.5	Dec 2000	22	Mar 1980	10	17	Feb 1978	51.0	16.4	4.0	1.6	@	61.2	39.2	25.6	7.0

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

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	9/21	9/26	9/29	10/02	10/05	10/08	10/11	10/15	10/19
32	9/30	10/05	10/09	10/12	10/15	10/18	10/21	10/25	10/30
28	10/13	10/18	10/22	10/25	10/28	10/31	11/03	11/07	11/12
24	10/25	10/31	11/05	11/08	11/12	11/15	11/19	11/23	11/29
20	11/06	11/12	11/16	11/19	11/23	11/26	11/29	12/03	12/09
16	11/16	11/22	11/26	11/29	12/02	12/05	12/09	12/12	12/18

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	168	161	156	151	147	143	139	134	127
32	190	183	177	173	169	165	161	156	149
28	214	207	202	198	194	190	185	180	173
24	241	233	228	223	218	214	209	203	195
20	263	255	249	243	238	233	228	222	213
16	278	271	266	261	257	253	248	243	236

***** 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	1292	1081	896	522	227	39	4	17	107	424	762	1132	6503
60	1137	941	741	377	133	10	0	2	41	290	612	977	5261
57	1044	857	648	295	89	4	0	0	20	221	523	884	4585
55	982	801	587	245	66	2	0	0	11	180	464	822	4160
50	827	661	443	138	26	0	0	0	2	97	325	672	3191
32	326	228	82	2	0	0	0	0	0	1	29	223	891

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	57	71	209	471	849	1091	1257	1199	941	609	257	114	7125
55	0	0	2	24	202	403	544	486	262	74	2	0	1999
57	0	0	0	14	163	344	482	424	211	53	1	0	1692
60	0	0	0	6	114	261	389	333	142	30	0	0	1275
65	0	0	0	1	53	139	238	193	58	9	0	0	691
70	0	0	0	0	19	55	108	88	15	1	0	0	286

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	5	11	87	279	621	864	1021	969	717	386	116	21	5	16	103	382	1003	1867	2888	3857	4574	4960	5076	5097
45	0	2	45	167	469	714	866	814	567	252	56	5	0	2	47	214	683	1397	2263	3077	3644	3896	3952	3957
50	0	0	23	90	324	565	711	659	418	145	22	2	0	0	23	113	437	1002	1713	2372	2790	2935	2957	2959
55	0	0	7	42	200	416	556	504	282	71	5	0	0	0	7	49	249	665	1221	1725	2007	2078	2083	2083
60	0	0	1	17	108	275	401	349	167	30	0	0	0	0	1	18	126	401	802	1151	1318	1348	1348	1348
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	5	55	168	378	566	697	651	442	211	58	7	0	5	60	228	606	1172	1869	2520	2962	3173	3231	3238

(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