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: MOUNT CLEMENS ANG BASE, MI **COOP ID: 205650**

Climate Division: MI10 **NWS Call Sign: MTC** **Elevation: 580 Feet** **Lat: 42˚36N** **Lon: 82˚49W**

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	30.7	18.0	24.4	63+	1967	23	34.1	1990	-18	1994	19	13.2	1977	1261	0	.0	.0	1.4	17.0	28.2	1.9
Feb	33.1	19.2	26.2	71	2000	26	35.9	1998	-11	1994	10	15.7	1978	1088	0	.0	.0	1.6	13.6	24.9	1.2
Mar	43.1	27.1	35.1	83	1998	30	41.9	1973	-1	1978	2	28.5	1978	927	0	.0	.0	7.9	4.9	22.3	.1
Apr	55.3	36.3	45.8	90	1990	25	50.8	1985	13	1982	8	39.7	1975	576	0	.0	@	20.6	.4	9.8	.0
May	68.0	47.0	57.5	93	1987	30	63.7	1991	10	1990	10	51.6	1983	265	32	.0	.2	30.1	.0	.8	.0
Jun	77.4	56.6	67.0	104	1988	25	71.2	1997	35+	1966	1	61.8	1980	60	120	@	2.2	30.0	.0	.0	.0
Jul	81.8	61.9	71.9	102	1995	14	77.8	1999	40	1965	1	68.0+	2000	13	224	.2	3.9	31.0	.0	.0	.0
Aug	79.3	60.3	69.8	99+	1948	25	76.1	1995	40	1965	29	66.5	1992	23	170	.0	1.5	31.0	.0	.0	.0
Sep	71.9	53.0	62.5	100	1953	1	67.6	1998	29	1991	28	58.0	1975	124	46	.0	.4	30.0	.0	.1	.0
Oct	59.8	42.5	51.2	89+	1963	7	59.1	1971	17	1965	29	45.7	1988	435	5	.0	.0	26.8	.0	2.9	.0
Nov	47.0	33.3	40.2	80	1950	1	46.1	1975	4	1958	30	32.8	1976	746	0	.0	.0	11.5	1.5	14.2	.0
Dec	35.4	23.5	29.5	69	2001	5	36.9	1982	-4+	1950	27	18.5	1989	1102	0	.0	.0	2.2	10.8	25.5	.5
Ann	56.9	39.9	48.4	104	Jun 1988	25	77.8	Jul 1999	-18	Jan 1994	19	13.2	Jan 1977	6620	597	.2	8.2	224.1	48.2	128.7	3.7

\+ 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: 1948-2001

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

Issue Date: February 2004

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Climate Division: MI10 **NWS Call Sign: MTC** **Elevation: 580 Feet** **Lat: 42˚36N** **Lon: 82˚49W**

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	1.89	1.55	1.57	1993	4	4.16	1999	.46	1981
Feb	1.82	1.48	2.28	1990	22	4.87	1990	.44	1979
Mar	2.33	2.16	1.85	1954	25	3.99	1998	.00	2000
Apr	2.95	2.67	2.55	2000	20	4.83	1979	.61	1971
May	2.86	2.92	2.44	1987	30	5.98	1997	.69	1971
Jun	3.12	3.02	4.78	1968	26	6.97	1986	.49	1988
Jul	3.46	2.93	4.24	1976	28	9.22	1976	1.01	1984
Aug	3.19	3.14	3.20	1984	29	7.26	1975	.90	1996
Sep	3.25	3.31	2.90	1981	30	7.38	1981	.00	1998
Oct	2.19	2.14	2.06	1951	23	4.36	1981	.00	1998
Nov	2.63	2.47	1.86	2001	30	5.69	1985	.78	1976
Dec	2.55	2.53	2.31	1951	18	3.93	1990	.77	1993
Ann	32.24	32.09	4.78	Jun 1968	26	9.22	Jul 1976	.00+	Mar 2000

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	13.9	4.9	.8	.2
Feb	10.5	4.1	.7	.2
Mar	12.7	5.9	1.1	.2
Apr	12.5	6.9	1.5	.3
May	10.5	5.9	1.8	.4
Jun	11.0	6.8	1.9	.6
Jul	10.2	6.2	2.0	.8
Aug	9.8	5.8	2.0	.8
Sep	9.7	5.9	2.0	.7
Oct	9.5	4.9	1.4	.3
Nov	11.6	6.1	1.6	.2
Dec	13.8	6.4	1.2	.2
Ann	135.7	69.8	18.0	4.9

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	.59	.77	1.03	1.26	1.49	1.72	1.97	2.27	2.65	3.25	3.80
Feb	.38	.55	.82	1.06	1.30	1.57	1.86	2.21	2.68	3.42	4.12
Mar	.85	1.18	1.52	1.78	2.02	2.25	2.49	2.77	3.12	3.66	4.13
Apr	1.31	1.57	1.94	2.24	2.52	2.80	3.10	3.44	3.88	4.54	5.13
May	.99	1.26	1.65	1.98	2.30	2.63	2.99	3.40	3.93	4.76	5.52
Jun	.94	1.23	1.67	2.06	2.43	2.81	3.24	3.74	4.39	5.40	6.33
Jul	1.14	1.47	1.95	2.36	2.76	3.16	3.61	4.13	4.80	5.85	6.81
Aug	1.27	1.56	1.98	2.33	2.65	2.99	3.34	3.76	4.29	5.09	5.83
Sep	.74	1.20	1.74	2.17	2.57	2.99	3.44	3.97	4.64	5.69	6.66
Oct	.64	.96	1.31	1.57	1.82	2.06	2.33	2.64	3.02	3.62	4.16
Nov	.79	1.04	1.42	1.74	2.05	2.38	2.74	3.16	3.70	4.55	5.34
Dec	1.32	1.53	1.81	2.04	2.25	2.45	2.67	2.92	3.23	3.69	4.11
Ann	24.23	25.81	27.83	29.35	30.68	31.97	33.30	34.75	36.51	39.04	41.22

\+ 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: 1948-2001
(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	9.9	9.5	3	2	8.0	1982	31	29.6	1978	25	1999	13	10	1999	10.8	3.5	.6	.2	.0	17.7	11.3	5.6	1.1
Feb	8.5	7.2	2	1	9.2	1985	12	21.8	1985	19+	1982	7	11	1978	7.7	2.3	.8	.3	.0	14.3	9.5	5.9	1.3
Mar	4.7	4.4	#	1	7.5	1992	22	10.3	1992	8	1999	7	2	1978	5.1	1.3	.4	.1	.0	5.3	2.0	.7	.0
Apr	1.5	.7	#	0	4.2	1975	3	7.7	1975	6	1982	6	1	1982	1.7	.5	.1	.0	.0	.8	.2	.1	.0
May	.0	.0	#	0	1.1	1976	3	1.1	1976	0	0	0	#	2000	.0	.0	.0	.0	.0	.0	.0	.0	.0
Jun	.0	.0	#	0	.0	0	0	.0	0	0	0	0	#	1991	.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	.1	.0	0	0	.8	1989	19	.8	1989	#	1976	27	0	0	.2	.0	.0	.0	.0	.0	.0	.0	.0
Nov	1.8	1.0	#	0	6.0	1975	27	6.1	1975	4+	1996	28	1	1996	2.5	.6	.1	@	.0	1.2	.4	.0	.0
Dec	10.6	8.7	1	1	8.7	1974	1	26.4	2000	12+	1977	11	7	2000	8.6	3.1	1.0	.4	.0	10.1	4.8	2.3	.2
Ann	37.1	31.5	N/A	N/A	9.2	Feb 1985	12	29.6	Jan 1978	25	Jan 1999	13	11	Feb 1978	36.6	11.3	3.0	1.0	.0	49.4	28.2	14.6	2.6

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

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	9/30	10/03	10/06	10/08	10/11	10/14	10/18
32	10/03	10/09	10/13	10/17	10/20	10/23	10/26	10/31	11/05
28	10/17	10/22	10/26	10/28	10/31	11/03	11/06	11/09	11/14
24	10/31	11/04	11/08	11/11	11/14	11/16	11/19	11/23	11/27
20	11/07	11/13	11/17	11/20	11/23	11/26	11/30	12/04	12/09
16	11/21	11/27	12/01	12/04	12/08	12/11	12/14	12/18	12/24

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	154	151	147	144	141	137	131
32	193	185	180	175	171	167	162	157	149
28	213	207	203	199	196	192	189	185	179
24	243	235	230	225	221	216	211	206	198
20	264	256	250	245	240	236	231	225	217
16	289	281	275	270	265	260	255	249	241

***** 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	1261	1088	927	576	265	60	13	23	124	435	746	1102	6620
60	1106	948	772	428	158	19	1	3	50	295	596	947	5323
57	1013	864	679	343	107	7	0	0	25	222	506	854	4620
55	951	808	617	288	80	4	0	0	14	179	446	792	4179
50	796	668	469	169	32	0	0	0	3	92	304	645	3178
32	304	229	86	3	0	0	0	0	0	0	18	204	844

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	67	65	182	417	790	1050	1234	1171	912	593	262	124	6867
55	0	0	0	12	157	364	521	458	236	58	1	0	1807
57	0	0	0	7	123	307	459	396	187	40	0	0	1519
60	0	0	0	2	80	229	366	306	122	20	0	0	1125
65	0	0	0	0	32	120	224	170	46	5	0	0	597
70	0	0	0	0	10	47	111	74	10	0	0	0	252

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	7	8	62	218	552	819	994	930	683	360	110	18	7	15	77	295	847	1666	2660	3590	4273	4633	4743	4761
45	0	0	28	123	399	669	839	775	533	226	52	3	0	0	28	151	550	1219	2058	2833	3366	3592	3644	3647
50	0	0	12	60	260	519	684	620	385	126	20	1	0	0	12	72	332	851	1535	2155	2540	2666	2686	2687
55	0	0	5	31	151	372	529	465	249	57	5	0	0	0	5	36	187	559	1088	1553	1802	1859	1864	1864
60	0	0	0	7	78	238	374	312	144	20	0	0	0	0	0	7	85	323	697	1009	1153	1173	1173	1173
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	2	38	123	321	524	669	618	410	184	49	5	0	2	40	163	484	1008	1677	2295	2705	2889	2938	2943

(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