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 PLEASANT UNIV, MI **COOP ID: 205662**

Climate Division: MI 6 **NWS Call Sign:** **Elevation: 796 Feet** **Lat: 43˚35N** **Lon: 84˚46W**

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	27.9	13.5	20.7	60	1950	26	31.1	1990	-23	1951	30	10.8	1977	1375	0	.0	.0	.5	20.3	30.1	4.0
Feb	30.8	14.7	22.8	62	1984	24	32.0	1998	-23	1951	9	12.6	1979	1183	0	.0	.0	.9	16.0	27.2	3.5
Mar	41.3	22.7	32.0	78	2000	9	40.8	2000	-15	1962	2	25.7	1972	1023	0	.0	.0	7.0	6.1	26.5	.6
Apr	54.9	33.8	44.4	88	1990	26	48.9	1986	8	1954	3	38.9	1975	620	0	.0	.0	19.8	.6	14.4	.0
May	68.5	44.7	56.6	92+	1977	19	63.2	1977	23	1966	10	49.6	1997	295	35	.0	.2	30.3	.0	1.9	.0
Jun	77.8	54.5	66.2	100	1995	20	70.5	1987	34+	1949	8	61.1	1982	72	105	@	1.9	30.0	.0	.0	.0
Jul	82.2	58.9	70.6	100+	1988	7	75.3	1987	41	1950	1	64.9	1992	14	185	.1	4.1	31.0	.0	.0	.0
Aug	79.6	57.1	68.4	100	1988	2	73.3	1995	36	1982	29	63.4	1992	38	141	@	2.1	31.0	.0	.0	.0
Sep	71.2	48.9	60.1	99	1953	1	65.4	1998	27+	1974	22	55.1	1975	172	24	.0	.5	29.9	.0	.5	.0
Oct	58.8	38.8	48.8	87	1971	2	56.1	1971	16	1950	26	43.5	1976	505	2	.0	.0	25.4	.0	6.5	.0
Nov	44.7	29.5	37.1	77	1950	1	43.9	1975	-6	1950	25	30.1	1995	837	0	.0	.0	9.7	3.1	20.9	.0
Dec	33.0	19.9	26.5	69	2001	6	34.1	1982	-14	1976	31	17.6	2000	1195	0	.0	.0	1.7	14.2	28.9	1.1
Ann	55.9	36.4	46.2	100+	Jun 1995	20	75.3	Jul 1987	-23+	Feb 1951	9	10.8	Jan 1977	7329	492	.1	8.8	217.2	60.3	156.9	9.2

\+ 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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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	1.65	1.36	1.28	1975	11	3.68	1975	.36	1977
Feb	1.26	1.07	1.05	1974	22	2.84	1997	.05	1987
Mar	2.13	2.00	2.15	1976	2	5.30	1976	.08	2000
Apr	3.11	3.01	3.35	1963	30	7.09	1991	1.15+	1990
May	2.72	2.37	3.22	2001	16	6.00	1973	.11	1988
Jun	3.47	3.56	4.20	1948	23	6.73	1996	.38	1988
Jul	2.69	2.61	4.25	1957	8	6.07	1991	.85	1989
Aug	3.70	3.46	3.42	1956	4	10.16	1975	.66	1984
Sep	3.56	3.37	9.35	1986	11	15.42	1986	.05	1979
Oct	2.80	2.46	3.79	1954	3	7.14	1991	.77	1975
Nov	2.58	2.29	2.37	1982	2	5.33	1994	.63	1996
Dec	1.90	1.67	2.14	1982	3	4.85	1971	.20	1993
Ann	31.57	31.03	9.35	Sep 1986	11	15.42	Sep 1986	.05+	Feb 1987

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	9.7	4.7	.8	.2
Feb	7.7	3.6	.7	.1
Mar	9.0	5.1	1.4	.2
Apr	10.5	7.1	2.0	.5
May	10.1	5.7	1.9	.6
Jun	9.7	6.2	2.1	.9
Jul	8.4	5.3	1.6	.4
Aug	9.9	6.3	2.6	.9
Sep	10.2	6.1	2.3	.8
Oct	10.5	5.8	1.7	.4
Nov	10.3	5.5	1.7	.4
Dec	10.4	4.9	.9	.2
Ann	116.4	66.3	19.7	5.6

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	.43	.59	.83	1.04	1.25	1.47	1.71	2.00	2.37	2.96	3.51
Feb	.21	.32	.50	.67	.85	1.05	1.27	1.54	1.90	2.49	3.05
Mar	.47	.66	.98	1.26	1.54	1.84	2.18	2.58	3.11	3.96	4.76
Apr	1.12	1.41	1.83	2.19	2.52	2.87	3.25	3.69	4.25	5.11	5.90
May	.41	.64	1.03	1.41	1.80	2.23	2.72	3.32	4.13	5.44	6.71
Jun	1.02	1.35	1.85	2.27	2.69	3.12	3.60	4.17	4.89	6.04	7.10
Jul	.99	1.24	1.61	1.91	2.20	2.49	2.81	3.19	3.66	4.39	5.06
Aug	1.00	1.35	1.88	2.35	2.81	3.29	3.82	4.46	5.28	6.57	7.78
Sep	.53	.83	1.34	1.84	2.35	2.91	3.56	4.35	5.41	7.14	8.80
Oct	.98	1.24	1.62	1.95	2.26	2.57	2.92	3.32	3.84	4.64	5.37
Nov	.78	1.03	1.39	1.71	2.01	2.33	2.68	3.09	3.62	4.45	5.21
Dec	.38	.55	.83	1.08	1.34	1.62	1.93	2.31	2.81	3.60	4.36
Ann	23.72	25.27	27.24	28.71	30.02	31.28	32.57	33.99	35.70	38.17	40.29

\+ 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	11.9	12.5	5	4	12.0	1979	14	25.8	1979	26	1979	15	17	1979	4.0	2.3	.9	.3	.1	-9.9	-9.9	-9.9	-9.9
Feb	4.6	3.6	5	4	8.0	1981	11	15.0	1973	22	1976	3	19	1979	2.6	1.9	.6	.3	.0	-9.9	-9.9	-9.9	-9.9
Mar	6.9	5.9	2	1	12.0	1972	13	24.0	1972	14+	1985	4	9	1985	1.9	1.7	.9	.3	.1	-9.9	-9.9	-9.9	-9.9
Apr	1.6	.0	#	0	8.7	1975	3	11.6	1975	10	1975	3	2	1975	.6	.4	.2	.1	.0	.9	.5	.3	.1
May	#	.0	0	0	#	1973	4	#+	1973	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	.1	.0	#	0	1.0	1980	15	1.0	1980	#	1981	23	#	1981	.1	.1	.0	.0	.0	.0	.0	.0	.0
Nov	2.7	1.8	#	#	8.0	1995	28	8.0	1995	8	1985	10	1	1985	.7	.6	.3	.1	.0	1.4	.5	.1	.0
Dec	9.4	10.5	2	2	7.0	1971	30	17.0	1983	8	1983	29	5	1972	3.4	2.6	.9	.1	.0	-9.9	-9.9	-9.9	-9.9
Ann	37.2	34.3	N/A	N/A	12.0+	Jan 1979	14	25.8	Jan 1979	26	Jan 1979	15	19	Feb 1979	13.3	9.6	3.8	1.2	.2	-9.9	-9.9	-9.9	-9.9

+ 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	6/03	5/28	5/24	5/21	5/18	5/14	5/11	5/07	5/02
32	5/16	5/12	5/09	5/06	5/04	5/01	4/28	4/25	4/21
28	5/06	5/01	4/28	4/25	4/23	4/20	4/17	4/14	4/10
24	4/19	4/15	4/13	4/11	4/09	4/07	4/04	4/02	3/29
20	4/13	4/09	4/07	4/04	4/02	3/31	3/29	3/26	3/22
16	4/07	4/03	3/31	3/28	3/25	3/23	3/20	3/16	3/12

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	9/10	9/15	9/18	9/21	9/24	9/26	9/29	10/02	10/07
32	9/24	9/29	10/03	10/07	10/10	10/13	10/16	10/20	10/26
28	10/08	10/14	10/19	10/22	10/26	10/29	11/02	11/07	11/13
24	10/21	10/27	10/31	11/03	11/06	11/09	11/12	11/16	11/21
20	11/04	11/10	11/13	11/16	11/19	11/22	11/26	11/29	12/04
16	11/14	11/20	11/24	11/27	11/30	12/03	12/07	12/11	12/17

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	143	138	134	131	128	125	122	118	113
32	180	172	167	163	159	154	150	145	138
28	214	204	197	191	185	180	174	167	157
24	231	224	219	215	211	207	202	197	190
20	250	244	239	234	231	227	222	217	211
16	273	265	259	254	249	245	240	234	226

***** 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	1375	1183	1023	620	295	72	14	38	172	505	837	1195	7329
60	1220	1043	868	472	187	25	0	8	77	359	687	1040	5986
57	1127	959	775	386	134	11	0	2	41	279	597	947	5258
55	1065	903	713	331	104	6	0	0	25	231	537	885	4800
50	910	763	561	209	48	1	0	0	5	131	392	730	3750
32	384	300	137	7	0	0	0	0	0	2	48	248	1126

Base — Cooling Degree Days (1)

Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	32	41	137	377	763	1023	1194	1127	842	522	201	76	6335
55	0	0	0	12	155	340	481	414	178	38	1	0	1619
57	0	0	0	7	122	284	419	353	134	24	0	0	1343
60	0	0	0	3	82	208	326	266	79	11	0	0	975
65	0	0	0	0	35	105	185	141	24	2	0	0	492
70	0	0	0	0	12	38	81	57	3	0	0	0	191

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	0	1	45	201	534	795	957	890	613	299	72	8	0	1	46	247	781	1576	2533	3423	4036	4335	4407	4415
45	0	0	16	113	388	645	802	735	466	178	32	2	0	0	16	129	517	1162	1964	2699	3165	3343	3375	3377
50	0	0	9	60	251	496	647	580	324	94	12	0	0	0	9	69	320	816	1463	2043	2367	2461	2473	2473
55	0	0	2	28	146	350	492	426	202	42	1	0	0	0	2	30	176	526	1018	1444	1646	1688	1689	1689
60	0	0	0	10	75	219	338	276	108	11	0	0	0	0	0	10	85	304	642	918	1026	1037	1037	1037
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	31	129	325	504	633	579	372	171	37	2	0	0	31	160	485	989	1622	2201	2573	2744	2781	2783

(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