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: LUPTON 1 S, MI **COOP ID: 204967**

Climate Division: MI 4 **NWS Call Sign:** **Elevation: 900 Feet** **Lat: 44˚25N** **Lon: 84˚01W**

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	26.9	4.7	15.8	56	1973	26	24.9	1990	-34	1963	15	5.8	1977	1525	0	.0	.0	.2	21.4	30.6	11.7
Feb	30.8	5.5	18.2	61	1984	24	31.5	1998	-41	1996	4	8.3	1979	1312	0	.0	.0	.8	16.0	27.7	10.1
Mar	40.9	15.0	28.0	79	2000	9	38.7	2000	-29	1962	1	20.8	1972	1149	0	.0	.0	6.3	6.8	28.8	4.1
Apr	54.7	27.5	41.1	89	1990	26	46.2	1986	-2+	1954	3	34.9	1972	718	0	.0	.0	19.5	.6	20.3	.1
May	68.5	38.1	53.3	96	1986	30	61.1	1998	17+	1963	1	46.5	1997	384	20	.0	.5	29.8	.0	9.0	.0
Jun	77.1	47.0	62.1	105	1995	20	66.8	1995	25+	1964	4	57.0	1982	141	52	.1	2.0	30.0	.0	.9	.0
Jul	81.5	51.7	66.6	102	1987	21	70.5	1987	30+	1965	6	61.9	1992	48	98	.2	3.7	31.0	.0	@	.0
Aug	78.9	49.7	64.3	102	1955	1	69.3	1995	26	1982	29	60.0	1977	94	72	@	1.5	31.0	.0	.3	.0
Sep	70.5	42.2	56.4	98	1953	2	61.4	1998	20+	1976	24	51.9	1975	265	6	.0	.3	29.9	.0	4.7	.0
Oct	57.9	31.9	44.9	86+	1963	6	52.9	1971	11	1976	28	39.7	1976	624	0	.0	.0	24.7	@	17.4	.0
Nov	43.6	23.6	33.6	75+	1999	1	39.3	1999	-12	1995	29	26.0	1976	942	0	.0	.0	8.0	3.3	24.6	.2
Dec	31.6	13.1	22.4	66	2001	6	30.5	1982	-25+	1976	30	10.4	1976	1321	0	.0	.0	1.3	15.8	30.2	5.2
Ann	55.2	29.2	42.2	105	Jun 1995	20	70.5	Jul 1987	-41	Feb 1996	4	5.8	Jan 1977	8523	248	.3	8.0	212.5	63.9	194.5	31.4

\+ 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

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	1.76	1.62	1.40	1997	5	3.12	1999	.50	1977
Feb	1.28	1.01	1.77	2001	9	3.32	1997	.02	1995
Mar	2.06	1.99	2.00	1998	31	5.36	1976	.41	1996
Apr	2.29	1.96	1.71	1981	9	5.23	1981	.85	1997
May	2.54	2.33	4.60	1959	20	6.43	1983	.92	1992
Jun	3.26	3.05	3.25	1999	14	7.65	2000	.82	1983
Jul	3.36	3.11	4.05	1951	4	10.25	1997	.84	1987
Aug	3.84	3.65	3.15	1979	10	7.20	1987	.70	1976
Sep	3.54	3.14	2.52	1968	10	9.94	1986	.68	1979
Oct	2.39	2.29	2.94	1954	3	6.71	1991	.75	1971
Nov	2.21	2.01	1.77	1970	3	4.95	1985	.47	1976
Dec	1.92	1.66	1.75	1971	10	4.97	1971	.31	1994
Ann	30.45	29.90	4.60	May 1959	20	10.25	Jul 1997	.02	Feb 1995

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	10.4	4.7	.9	.1
Feb	8.4	3.8	.7	.1
Mar	9.0	5.4	1.1	.3
Apr	9.4	6.1	1.3	.2
May	9.9	6.1	1.6	.3
Jun	10.4	6.5	1.9	.6
Jul	10.4	5.7	2.3	.7
Aug	11.3	6.9	2.8	.9
Sep	11.6	6.3	2.3	.7
Oct	11.0	5.7	1.6	.3
Nov	10.8	5.4	1.2	.3
Dec	10.8	5.5	.9	.2
Ann	123.4	68.1	18.6	4.7

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	.66	.83	1.06	1.26	1.45	1.64	1.84	2.08	2.38	2.85	3.28
Feb	.19	.30	.49	.66	.85	1.05	1.28	1.57	1.95	2.57	3.17
Mar	.52	.71	1.01	1.28	1.54	1.82	2.12	2.49	2.97	3.73	4.45
Apr	.88	1.10	1.40	1.65	1.89	2.14	2.40	2.71	3.09	3.69	4.24
May	.99	1.22	1.56	1.84	2.10	2.37	2.66	2.99	3.42	4.08	4.67
Jun	1.01	1.32	1.78	2.18	2.56	2.96	3.39	3.90	4.56	5.59	6.54
Jul	1.06	1.38	1.85	2.25	2.65	3.05	3.49	4.02	4.69	5.73	6.70
Aug	1.38	1.75	2.27	2.70	3.12	3.54	4.01	4.55	5.24	6.30	7.28
Sep	1.13	1.47	1.97	2.39	2.80	3.22	3.69	4.23	4.93	6.02	7.03
Oct	.83	1.06	1.39	1.66	1.93	2.20	2.50	2.84	3.29	3.97	4.60
Nov	.72	.93	1.24	1.50	1.75	2.02	2.30	2.64	3.07	3.75	4.37
Dec	.59	.77	1.04	1.27	1.50	1.74	2.00	2.30	2.69	3.31	3.88
Ann	24.92	26.05	27.46	28.51	29.43	30.31	31.20	32.18	33.34	35.01	36.42

\+ 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	16.3	14.5	10	10
Feb	9.2	9.3	11	11
Mar	9.3	8.9	7	6
Apr	2.7	2.3	1	#
May	.2	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.0	.0	0	0
Oct	.5	.0	#	0
Nov	4.3	3.6	1	#
Dec	12.4	12.9	4	3
Ann	54.9	51.5	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	11.0	1978	26	30.5	1982	26	1979	26	21	1979
Feb	10.0	1981	11	16.4	1985	26	1982	1	21	1979
Mar	11.0	1971	19	23.7	1971	27	1971	20	21	1971
Apr	6.0	1993	2	7.6	1979	15	1972	6	6	1972
May	3.0	1984	14	3.4	1984	1	1984	14	#+	1990
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	6.5	1997	27	6.5	1997	7	1997	27	#+	1997
Nov	5.1	1985	10	13.1	1971	14	1995	28	3	1995
Dec	9.0	1991	3	28.1	1972	16	1972	16	11	1995
Ann	11.0+	Jan 1978	26	30.5	Jan 1982	27	Mar 1971	20	21+	Feb 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	9.0	5.4	1.7	.7	@
Feb	6.3	3.4	.8	.3	@
Mar	5.0	3.0	.8	.3	.1
Apr	1.6	1.0	.2	.1	.0
May	.2	.1	@	.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	.1	.1	.1	@	.0
Nov	3.4	1.8	.3	@	.0
Dec	7.8	3.9	1.2	.3	.0
Ann	33.4	18.7	5.1	1.7	.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	29.1	28.0	25.9	15.1
Feb	27.2	25.3	22.0	14.5
Mar	21.3	17.5	14.6	9.7
Apr	3.4	2.2	1.6	.6
May	.1	.0	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.0	.0	.0	.0
Oct	.1	.1	@	.0
Nov	5.2	1.5	.6	.0
Dec	21.0	14.1	8.7	2.2
Ann	107.4	88.7	73.4	42.1

+ 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	7/19	7/11	7/05	6/29	6/25	6/20	6/14	6/08	5/31
32	6/16	6/10	6/06	6/02	5/30	5/27	5/23	5/19	5/13
28	6/04	5/29	5/25	5/22	5/19	5/15	5/12	5/08	5/02
24	5/16	5/11	5/07	5/04	5/01	4/28	4/25	4/22	4/17
20	5/01	4/27	4/24	4/21	4/19	4/17	4/14	4/11	4/07
16	4/21	4/17	4/14	4/11	4/09	4/07	4/04	4/01	3/28

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	8/13	8/19	8/24	8/28	8/31	9/04	9/08	9/12	9/19
32	9/01	9/05	9/09	9/12	9/15	9/18	9/20	9/24	9/29
28	9/09	9/14	9/18	9/22	9/25	9/29	10/02	10/06	10/12
24	9/28	10/03	10/07	10/10	10/13	10/16	10/19	10/23	10/28
20	10/06	10/13	10/18	10/22	10/25	10/29	11/02	11/07	11/13
16	10/22	10/28	11/02	11/06	11/10	11/14	11/18	11/23	11/30

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	98	87	80	73	67	61	54	46	36
32	127	120	115	111	107	103	99	94	87
28	154	145	139	134	129	124	119	113	104
24	187	179	174	169	164	159	154	149	141
20	217	207	200	194	189	183	177	170	161
16	241	232	226	220	214	209	203	197	187

***** 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	1525	1312	1149	718	384	141	48	94	265	624	942	1321	8523
60	1370	1172	994	569	261	65	9	30	142	473	792	1166	7043
57	1277	1088	901	481	199	36	2	12	87	386	702	1073	6244
55	1215	1032	839	423	162	23	0	6	59	331	642	1011	5743
50	1060	892	685	290	88	6	0	0	17	210	493	856	4597
32	520	416	223	22	1	0	0	0	0	9	81	357	1629

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	18	28	97	294	659	901	1073	1001	731	408	129	59	5398
55	0	0	0	6	108	234	360	294	100	17	0	0	1119
57	0	0	0	3	83	187	300	238	67	10	0	0	888
60	0	0	0	1	52	126	214	163	33	4	0	0	593
65	0	0	0	0	20	52	98	72	6	0	0	0	248
70	0	0	0	0	7	14	27	20	0	0	0	0	68

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	0	25	143	441	681	842	771	505	204	43	2	0	0	25	168	609	1290	2132	2903	3408	3612	3655	3657
45	0	0	10	78	301	531	687	616	360	108	14	0	0	0	10	88	389	920	1607	2223	2583	2691	2705	2705
50	0	0	1	37	183	387	532	461	230	52	5	0	0	0	1	38	221	608	1140	1601	1831	1883	1888	1888
55	0	0	0	15	104	245	377	311	127	20	0	0	0	0	0	15	119	364	741	1052	1179	1199	1199	1199
60	0	0	0	4	51	136	233	174	59	3	0	0	0	0	0	4	55	191	424	598	657	660	660	660
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	25	123	308	439	548	500	332	148	29	1	0	0	25	148	456	895	1443	1943	2275	2423	2452	2453

(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