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: SANDUSKY, OH **COOP ID: 337447**

Climate Division: OH 2 **NWS Call Sign:** **Elevation: 584 Feet** **Lat: 41˚27N** **Lon: 82˚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	32.2	18.9	25.6	73	1950	25	35.3	1990	-20+	1994	20	12.1	1977	1223	0	.0	.0	2.5	15.3	28.2	2.8
Feb	35.0	21.0	28.0	73	2000	27	36.3	1998	-7+	1982	10	14.9	1978	1037	0	.0	.0	3.2	12.3	24.4	1.7
Mar	44.3	29.5	36.9	84	1938	22	44.1	2000	-7	1978	2	28.7	1984	871	0	.0	.0	9.3	4.4	20.5	@
Apr	55.9	39.6	47.8	90	1942	30	54.9	1985	16	1982	8	41.8	1975	519	1	.0	.0	20.1	.2	5.4	.0
May	67.4	51.3	59.4	93+	1977	22	65.6	1991	30	1966	10	52.7	1997	223	47	.0	.2	30.3	.0	@	.0
Jun	77.2	61.2	69.2	103	1988	26	72.5	1984	38	1969	21	64.3	1972	28	154	@	2.3	30.0	.0	.0	.0
Jul	81.8	65.7	73.8	105	1936	14	77.4	1999	41	1970	21	70.2	2000	0	272	.0	4.3	31.0	.0	.0	.0
Aug	79.9	64.0	72.0	102	1936	22	76.3	1983	45+	1986	30	67.4	1992	9	224	.0	2.1	31.0	.0	.0	.0
Sep	73.4	56.9	65.2	99	1953	1	69.7	1978	34	1956	21	60.5	1975	73	77	.0	.9	30.0	.0	.0	.0
Oct	61.8	45.7	53.8	93	1953	3	61.3	1971	24+	1988	31	48.0	1988	359	10	.0	.0	27.9	.0	1.5	.0
Nov	49.1	36.0	42.6	82	1950	1	48.0	1975	3	1958	30	35.5	1976	674	0	.0	.0	13.5	1.1	12.9	.0
Dec	37.2	25.1	31.2	73	1982	4	40.4	1982	-16+	1989	23	17.6	1989	1049	0	.0	.0	4.1	9.0	24.9	.9
Ann	57.9	42.9	50.5	105	Jul 1936	14	77.4	Jul 1999	-20+	Jan 1994	20	12.1	Jan 1977	6065	785	@	9.8	232.9	42.3	117.8	5.4

\+ 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: 1936-2001

(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	1.87	1.54	2.03+	1998	8	4.62	1978	.38	1971
Feb	1.72	1.71	2.10	1997	27	4.23	1990	.02	1987
Mar	2.51	2.22	2.11	1985	29	5.44	1985	.95	1971
Apr	3.03	3.17	2.65	1979	14	5.56	1998	.89	1971
May	3.42	3.78	3.83	1938	19	6.12	2000	.68	1998
Jun	4.19	3.64	5.63	1937	25	10.29	1973	.68	1988
Jul	3.34	3.20	6.01	1966	12	7.99	1992	1.27	1974
Aug	3.65	3.53	3.10	1972	7	9.93	1975	.40	1996
Sep	3.16	2.53	3.45	1961	1	6.65	1972	.92	1991
Oct	2.30	2.02	2.28	1988	18	4.66	1983	.77	1974
Nov	2.73	2.31	1.69	1982	1	6.53	1982	.23	1976
Dec	2.54	2.74	2.35	1992	31	6.44	1990	.84	1976
Ann	34.46	35.09	6.01	Jul 1966	12	10.29	Jun 1973	.02	Feb 1987

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	10.8	5.1	1.0	.1
Feb	9.4	4.3	1.0	.2
Mar	10.8	6.3	1.3	.4
Apr	12.2	7.0	2.0	.4
May	12.2	6.8	2.4	.7
Jun	11.1	7.1	2.8	1.0
Jul	9.7	6.4	2.4	.8
Aug	9.8	6.3	2.8	.8
Sep	9.9	6.0	1.8	.7
Oct	10.1	5.6	1.2	.3
Nov	11.7	6.2	1.8	.3
Dec	11.9	6.1	1.5	.2
Ann	129.6	73.2	22.0	5.9

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	.45	.63	.90	1.14	1.39	1.64	1.93	2.27	2.71	3.42	4.08
Feb	.30	.46	.71	.94	1.18	1.44	1.74	2.09	2.57	3.34	4.07
Mar	1.02	1.25	1.58	1.84	2.09	2.35	2.62	2.94	3.34	3.96	4.52
Apr	1.22	1.50	1.89	2.22	2.53	2.84	3.18	3.57	4.06	4.82	5.51
May	1.11	1.44	1.92	2.32	2.72	3.12	3.56	4.08	4.75	5.79	6.74
Jun	1.31	1.71	2.30	2.81	3.29	3.80	4.36	5.01	5.85	7.16	8.38
Jul	1.23	1.54	1.99	2.37	2.73	3.09	3.49	3.95	4.54	5.45	6.28
Aug	.83	1.17	1.71	2.19	2.67	3.18	3.75	4.43	5.33	6.75	8.10
Sep	.85	1.15	1.61	2.01	2.40	2.81	3.27	3.81	4.52	5.63	6.67
Oct	.87	1.08	1.39	1.65	1.89	2.14	2.40	2.72	3.11	3.72	4.28
Nov	.66	.92	1.32	1.67	2.02	2.39	2.81	3.30	3.95	4.98	5.94
Dec	.96	1.20	1.54	1.82	2.09	2.37	2.66	3.01	3.44	4.12	4.73
Ann	25.33	27.12	29.40	31.13	32.65	34.12	35.63	37.30	39.31	42.23	44.74

\+ 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: 1936-2001
(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	8.3	8.1	2	1	10.0	1996	3	37.7	1978	20	1978	29	7	1994	6.0	3.1	.9	.1	@	10.9	5.7	3.2	.3
Feb	5.2	4.5	2	1	6.4	1982	1	15.5	1982	25	1978	1	15	1978	4.0	2.1	.5	.2	.0	6.9	3.7	1.7	.2
Mar	2.6	1.1	#	#	5.5	1982	3	9.0+	1987	15	1984	1	6	1984	2.1	1.2	.4	.1	.0	2.5	.6	.2	.0
Apr	.6	.0	#	#	7.4	1982	6	8.1	1982	7	1982	6	#+	1996	.4	.1	.1	@	.0	.2	.1	@	.0
May	#	.0	#	0	#	1989	7	#+	1989	#	1989	7	#	1989	.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	.0	.0	0	0	.1	1972	19	.1	1972	0	0	0	0	0	@	.0	.0	.0	.0	.0	.0	.0	.0
Nov	.3	.0	#	#	2.0	1978	27	2.4	1980	3	1977	29	#+	1997	.5	.2	.0	.0	.0	.2	.0	.0	.0
Dec	5.2	4.0	1	#	5.5	1973	20	13.4	1981	10	1977	9	3	1977	3.3	1.9	.5	.1	.0	5.2	1.8	.5	.0
Ann	22.2	17.7	N/A	N/A	10.0	Jan 1996	3	37.7	Jan 1978	25	Feb 1978	1	15	Feb 1978	16.3	8.6	2.4	.5	@	25.9	11.9	5.6	.5

\+ 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	5/08	5/03	4/30	4/28	4/25	4/23	4/20	4/17	4/13
32	4/28	4/24	4/21	4/18	4/16	4/14	4/11	4/08	4/04
28	4/15	4/11	4/08	4/05	4/03	4/01	3/29	3/26	3/22
24	4/08	4/04	3/31	3/29	3/26	3/23	3/21	3/17	3/13
20	4/03	3/28	3/23	3/20	3/16	3/13	3/09	3/05	2/27
16	3/24	3/17	3/12	3/07	3/03	2/27	2/22	2/17	2/10

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	10/01	10/06	10/10	10/13	10/16	10/18	10/21	10/25	10/30
32	10/16	10/21	10/24	10/27	10/30	11/02	11/05	11/09	11/14
28	10/24	10/30	11/03	11/06	11/09	11/12	11/15	11/19	11/24
24	11/03	11/09	11/13	11/17	11/20	11/23	11/27	12/01	12/07
20	11/17	11/23	11/27	12/01	12/04	12/08	12/11	12/15	12/21
16	11/28	12/03	12/07	12/10	12/14	12/17	12/20	12/24	12/29

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	188	183	179	176	173	170	166	163	157
32	217	210	205	200	196	192	188	183	176
28	238	232	227	223	219	215	211	206	200
24	260	253	247	243	238	234	229	224	216
20	285	277	272	267	262	258	253	248	240
16	312	303	296	290	285	279	273	267	257

***** 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	1223	1037	871	519	223	28	0	9	73	359	674	1049	6065
60	1068	897	716	373	127	6	0	0	23	230	524	894	4858
57	975	813	624	292	84	2	0	0	9	166	437	801	4203
55	913	757	566	241	61	1	0	0	5	129	382	741	3796
50	760	620	424	134	22	0	0	0	1	61	253	597	2872
32	287	207	80	2	0	0	0	0	0	0	18	186	780

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	86	94	232	473	848	1116	1295	1239	994	674	334	160	7545
55	0	0	5	23	195	427	582	526	309	90	9	3	2169
57	0	0	1	13	156	368	520	464	253	65	3	0	1843
60	0	0	0	5	106	282	427	371	177	36	1	0	1405
65	0	0	0	1	47	154	272	224	77	10	0	0	785
70	0	0	0	0	16	61	134	105	22	1	0	0	339

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	15	25	94	268	606	884	1046	985	748	423	149	34	15	40	134	402	1008	1892	2938	3923	4671	5094	5243	5277
45	0	7	50	161	453	734	891	830	598	284	84	13	0	7	57	218	671	1405	2296	3126	3724	4008	4092	4105
50	0	1	25	88	309	584	736	675	449	167	37	4	0	1	26	114	423	1007	1743	2418	2867	3034	3071	3075
55	0	0	13	45	189	434	581	520	307	86	13	0	0	0	13	58	247	681	1262	1782	2089	2175	2188	2188
60	0	0	3	21	101	291	426	365	182	38	4	0	0	0	3	24	125	416	842	1207	1389	1427	1431	1431
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	5	11	54	143	336	576	719	669	457	220	71	16	5	16	70	213	549	1125	1844	2513	2970	3190	3261	3277

(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