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: ALEXANDRIA CHANDLER AP, MN **COOP ID: 210112**

Climate Division: MN 4 **NWS Call Sign: AXN** **Elevation: 1,416 Feet** **Lat: 45˚52N** **Lon: 95˚24W**

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	17.1	-1.3	7.9	58	1981	24	21.3	1990	-38+	1977	16	-5.6	1982	1772	0	.0	.0	.1	26.9	31.0	16.8
Feb	24.1	6.4	15.3	58	1981	17	29.5	1998	-34	1951	1	2.2	1989	1394	0	.0	.0	.4	19.6	27.8	10.1
Mar	35.6	18.7	27.2	75+	1968	30	36.4	2000	-34	1962	1	18.1	1975	1174	0	.0	.0	3.7	10.2	27.5	3.3
Apr	52.5	32.6	42.6	95	1980	21	52.1	1987	-2+	1975	1	34.0	1975	675	2	.0	@	18.7	1.2	14.4	.1
May	66.9	45.7	56.3	97	1959	1	63.9	1977	18	1967	3	49.1	1979	301	31	.0	.3	29.6	.0	1.4	.0
Jun	75.5	54.7	65.1	102	1988	24	72.5	1988	35	1964	2	59.5	1982	91	93	.1	1.6	30.0	.0	.0	.0
Jul	80.6	59.6	70.1	101	1976	9	75.5	1988	42	1967	4	62.7	1992	30	187	.2	3.6	31.0	.0	.0	.0
Aug	78.2	57.4	67.8	104	1983	7	73.7	1983	38	1950	20	63.0	1977	52	139	.1	2.3	31.0	.0	.0	.0
Sep	68.3	47.2	57.8	98	1978	7	64.6	1998	24	1974	22	53.1	1974	240	22	.0	.5	29.1	.0	.7	.0
Oct	54.8	35.5	45.2	90+	1963	5	51.2	1973	9	1951	31	40.1	1976	616	0	.0	.0	21.6	.4	9.8	.0
Nov	35.3	20.8	28.1	76	1999	8	38.0	1999	-18	1964	30	18.9	1985	1109	0	.0	.0	4.2	12.1	26.1	1.3
Dec	21.5	5.8	13.7	58	1962	3	24.6	1997	-32+	1983	23	-1.4	1983	1592	0	.0	.0	.3	25.0	30.8	11.0
Ann	50.9	31.9	41.4	104	Aug 1983	7	75.5	Jul 1988	-38+	Jan 1977	16	-5.6	Jan 1982	9046	474	.4	8.3	199.7	95.4	169.5	42.6

\+ 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	1.01	.98	1.17	1975	10	4.16	1975	.08	2000
Feb	.67	.62	.69	1954	20	2.17	1971	.08	1988
Mar	1.50	1.47	1.23	2000	8	3.03	1977	.38	1981
Apr	1.91	1.75	2.07	2001	7	6.51	1986	.00	1980
May	3.02	2.97	2.48	1986	8	5.89	1972	.27	1976
Jun	4.38	4.02	3.80	1978	30	7.98	1975	.53	1988
Jul	3.29	3.24	2.50	1962	1	7.95	1972	.78	1989
Aug	3.55	3.20	3.20	1964	29	7.96	1988	.46	1976
Sep	2.71	2.41	2.83	1995	29	5.40	1985	.43	1972
Oct	2.16	1.75	2.64	1984	14	8.19	1984	.02	1976
Nov	1.24	.88	2.11	2000	1	4.06	1977	.04+	1984
Dec	.58	.55	1.34	1951	3	1.69	1977	.06	1979
Ann	26.02	25.94	3.80	Jun 1978	30	8.19	Oct 1984	.00	Apr 1980

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	9.5	2.9	.3	.2
Feb	7.2	2.1	.2	.0
Mar	8.4	3.6	.8	.2
Apr	9.0	4.5	1.1	.2
May	10.8	6.3	1.7	.5
Jun	12.0	7.3	2.7	1.1
Jul	10.6	6.5	2.5	.8
Aug	9.8	5.6	2.4	.8
Sep	9.4	5.1	1.9	.5
Oct	7.5	4.1	1.5	.5
Nov	7.8	3.1	.7	.2
Dec	8.2	1.7	.1	@
Ann	110.2	52.8	15.9	5.0

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	.12	.20	.35	.49	.64	.80	.99	1.23	1.56	2.09	2.61
Feb	.14	.20	.30	.39	.48	.58	.68	.81	.99	1.26	1.52
Mar	.52	.66	.87	1.05	1.21	1.38	1.57	1.79	2.07	2.50	2.90
Apr	.24	.49	.81	1.08	1.36	1.64	1.97	2.36	2.87	3.69	4.46
May	1.05	1.33	1.75	2.10	2.43	2.78	3.15	3.59	4.15	5.02	5.82
Jun	1.28	1.70	2.33	2.87	3.39	3.94	4.54	5.25	6.18	7.62	8.96
Jul	1.16	1.47	1.92	2.30	2.66	3.03	3.44	3.91	4.51	5.45	6.30
Aug	.95	1.29	1.80	2.25	2.70	3.16	3.67	4.28	5.08	6.32	7.49
Sep	.72	.98	1.37	1.72	2.05	2.41	2.80	3.27	3.88	4.83	5.72
Oct	.10	.22	.47	.75	1.09	1.48	1.97	2.60	3.49	5.01	6.53
Nov	.07	.14	.29	.45	.65	.87	1.14	1.50	1.99	2.83	3.67
Dec	.07	.12	.20	.28	.37	.46	.57	.71	.89	1.19	1.48
Ann	16.49	18.25	20.55	22.33	23.94	25.50	27.13	28.95	31.18	34.46	37.33

\+ 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	8.1	9.2	8	7	12.2	1975	10	13.1+	1980	30	1975	12	21	1994	8.7	2.5	.6	.2	.1	28.9	26.1	22.4	9.2
Feb	7.3	7.0	9	6	6.6	1986	19	17.3	1979	30+	1979	26	23+	1982	6.6	2.4	.7	.2	.0	26.2	22.4	20.0	10.0
Mar	9.1	9.3	6	5	10.0	1985	4	21.3	1975	31+	1972	9	18	1979	5.9	2.2	1.2	.5	@	20.3	16.7	13.6	7.4
Apr	2.7	1.3	1	2	7.6	1992	10	13.0	1991	24+	1975	2	6	1975	2.3	.8	.4	.1	.0	3.2	1.8	1.3	.4
May	#	.0	#	0	#	1992	25	#+	1992	#+	1994	1	#	1995	.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	.9	1985	24	.9	1985	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Oct	.6	.1	#	0	3.2	1995	23	6.0	1995	2	1995	24	#	1995	.8	.2	@	.0	.0	.4	.0	.0	.0
Nov	6.7	7.3	1	1	10.0	1983	28	19.8	1985	13	1983	29	3+	1992	5.6	2.3	.7	.2	@	10.0	5.1	2.9	.1
Dec	5.8	5.5	4	3	4.5	1992	13	12.3	1972	27	1985	2	19	1985	8.0	2.0	.2	.0	.0	23.8	16.1	10.5	2.8
Ann	40.3	39.7	N/A	N/A	12.2	Jan 1975	10	21.3	Mar 1975	31+	Mar 1972	9	23+	Feb 1982	37.9	12.4	3.8	1.2	.1	112.8	88.2	70.7	29.9

+ 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	5/21	5/17	5/14	5/12	5/10	5/08	5/06	5/03	4/29
32	5/16	5/11	5/07	5/04	5/01	4/28	4/25	4/22	4/17
28	5/01	4/27	4/24	4/21	4/19	4/17	4/14	4/11	4/07
24	4/19	4/15	4/13	4/11	4/09	4/07	4/05	4/02	3/30
20	4/15	4/11	4/08	4/06	4/03	4/01	3/29	3/26	3/22
16	4/11	4/06	4/02	3/30	3/27	3/24	3/21	3/17	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	9/14	9/18	9/21	9/23	9/26	9/28	9/30	10/03	10/07
32	9/23	9/27	9/30	10/02	10/05	10/07	10/10	10/13	10/17
28	9/29	10/04	10/07	10/10	10/13	10/16	10/19	10/23	10/28
24	10/10	10/15	10/19	10/22	10/25	10/28	10/31	11/04	11/09
20	10/24	10/28	10/31	11/02	11/04	11/06	11/09	11/12	11/15
16	10/26	10/31	11/03	11/06	11/09	11/12	11/14	11/18	11/22

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	155	149	145	141	138	134	131	126	121
32	176	169	164	160	156	152	147	143	136
28	199	191	186	181	176	172	167	162	154
24	217	211	206	202	199	195	191	187	181
20	233	226	222	218	214	211	207	202	196
16	249	241	236	231	226	222	217	211	204

***** 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	1772	1394	1174	675	301	91	30	52	240	616	1109	1592	9046
60	1617	1254	1019	531	192	34	7	15	133	462	959	1437	7660
57	1524	1170	926	448	139	16	1	5	84	372	869	1344	6898
55	1462	1114	864	396	110	9	0	2	59	315	809	1282	6422
50	1307	974	712	277	53	1	0	0	18	190	660	1127	5319
32	769	514	252	33	0	0	0	0	0	6	219	608	2401

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	20	44	100	349	753	992	1180	1110	772	414	100	39	5873
55	0	0	0	22	150	311	467	400	141	9	0	0	1500
57	0	0	0	15	118	258	406	340	106	5	0	0	1248
60	0	0	0	7	77	186	320	257	65	1	0	0	913
65	0	0	0	2	31	93	187	139	22	0	0	0	474
70	0	0	0	0	10	33	93	60	5	0	0	0	201

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	16	181	546	787	969	895	565	229	23	0	0	0	16	197	743	1530	2499	3394	3959	4188	4211	4211
45	0	0	5	100	400	637	814	740	417	128	9	0	0	0	5	105	505	1142	1956	2696	3113	3241	3250	3250
50	0	0	0	52	261	488	659	585	280	60	2	0	0	0	0	52	313	801	1460	2045	2325	2385	2387	2387
55	0	0	0	18	153	343	504	430	167	21	0	0	0	0	0	18	171	514	1018	1448	1615	1636	1636	1636
60	0	0	0	5	75	210	349	280	86	7	0	0	0	0	0	5	80	290	639	919	1005	1012	1012	1012
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	0	0	11	111	318	493	641	580	323	124	13	0	0	0	11	122	440	933	1574	2154	2477	2601	2614	2614

(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