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: MAQUOKETA 3 S, IA **COOP ID: 135131**

Climate Division: IA 6 **NWS Call Sign:** **Elevation: 680 Feet** **Lat: 42˚01N** **Lon: 90˚39W**

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	26.5	8.2	17.4	62	1897	1	29.4	1990	-32	1919	4	4.8	1977	1478	0	.0	.0	.6	20.2	30.4	9.2
Feb	32.4	13.4	22.9	69+	1989	1	35.6	1998	-34	1996	4	10.3	1979	1179	0	.0	.0	2.4	13.0	26.2	5.4
Mar	44.8	25.1	35.0	85	1986	29	43.2	1973	-20	1962	1	26.0	1975	931	0	.0	.0	10.7	4.0	23.1	.8
Apr	58.7	36.4	47.6	93+	1930	10	54.2	1977	5	1982	7	42.2	1982	525	2	.0	.1	23.7	.3	10.2	.0
May	70.6	48.1	59.4	105	1934	31	65.8	1977	26+	1925	7	53.0	1997	224	49	.0	.6	30.7	.0	1.0	.0
Jun	80.3	58.3	69.3	104+	1931	28	75.8	1971	32	1900	30	64.1	1982	26	154	.1	3.3	30.0	.0	.0	.0
Jul	83.6	62.3	73.0	108+	1901	24	77.0	1987	39	1904	2	67.9	1992	8	255	.1	6.6	31.0	.0	.0	.0
Aug	81.3	59.9	70.6	108	1936	18	76.3	1995	34	1934	29	64.4	1992	26	201	.3	3.5	31.0	.0	.0	.0
Sep	73.7	50.2	62.0	102	1939	7	66.7	1998	17	1899	30	56.6	1993	136	44	.0	1.3	29.9	.0	.8	.0
Oct	62.1	38.6	50.4	94	1997	4	58.6	1971	2	1925	30	43.9	1988	458	4	.0	.1	27.8	@	8.4	.0
Nov	45.0	26.4	35.7	80	1933	1	43.3	1999	-8+	1930	28	28.3	1976	879	0	.0	.0	11.0	3.5	21.4	.3
Dec	31.6	15.0	23.3	68	1998	5	31.5	1982	-27	1963	21	11.2	2000	1293	0	.0	.0	1.7	14.0	29.2	4.7
Ann	57.6	36.8	47.2	108+	Aug 1936	18	77.0	Jul 1987	-34	Feb 1996	4	4.8	Jan 1977	7163	709	.5	15.5	230.5	55.0	150.7	20.4

\+ 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: 1897-2001

(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	1.17	1.02	2.21	1960	12	3.05	1974	.06	1981
Feb	1.31	1.07	2.06	2001	9	3.21	1998	.06+	1995
Mar	2.23	1.85	2.44	1945	25	5.37	1991	.25	1981
Apr	3.31	3.13	3.03	1972	16	6.55	1999	.75	1985
May	4.00	3.72	2.89	1919	3	10.32	1996	.39	1992
Jun	4.44	3.84	4.53	1981	13	11.29	1981	.62	1992
Jul	3.48	3.19	4.27	1963	19	8.72	1992	1.24	1998
Aug	4.69	3.53	6.93	1981	30	14.45	1981	.95	1976
Sep	3.68	3.18	4.99	1961	13	12.05	1986	.23	1979
Oct	2.48	2.04	3.50	1943	21	7.39	1984	.55	1993
Nov	2.52	2.60	3.12	1952	17	6.02	1992	.29	1976
Dec	1.77	1.48	2.66	1971	15	4.54	1982	.32	1995
Ann	35.08	34.67	6.93	Aug 1981	30	14.45	Aug 1981	.06+	Feb 1995

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	7.3	3.7	.4	.0
Feb	6.0	3.3	.6	.1
Mar	8.6	5.0	1.6	.2
Apr	9.8	6.5	2.1	.7
May	11.2	7.8	2.9	1.0
Jun	10.3	6.9	3.5	1.0
Jul	9.5	6.6	2.2	.9
Aug	9.4	6.8	2.9	1.5
Sep	8.3	5.8	2.5	1.1
Oct	8.0	5.2	1.5	.5
Nov	8.5	5.5	1.7	.5
Dec	7.6	4.2	.9	.3
Ann	104.5	67.3	22.8	7.8

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	.28	.39	.56	.71	.87	1.02	1.20	1.42	1.69	2.13	2.55
Feb	.12	.22	.39	.57	.77	1.00	1.26	1.59	2.05	2.81	3.56
Mar	.41	.61	.94	1.24	1.55	1.88	2.26	2.72	3.32	4.30	5.24
Apr	1.08	1.40	1.86	2.25	2.63	3.02	3.45	3.95	4.60	5.60	6.53
May	.94	1.31	1.90	2.42	2.94	3.49	4.11	4.84	5.81	7.34	8.79
Jun	1.03	1.44	2.09	2.67	3.25	3.87	4.56	5.38	6.46	8.17	9.79
Jul	1.04	1.37	1.86	2.29	2.71	3.14	3.62	4.18	4.91	6.05	7.10
Aug	.99	1.42	2.10	2.73	3.36	4.03	4.79	5.70	6.90	8.81	10.63
Sep	.49	.79	1.32	1.83	2.37	2.96	3.65	4.49	5.64	7.51	9.31
Oct	.50	.73	1.09	1.42	1.76	2.12	2.53	3.02	3.67	4.71	5.70
Nov	.54	.77	1.14	1.48	1.81	2.17	2.58	3.06	3.70	4.72	5.69
Dec	.39	.55	.81	1.04	1.28	1.53	1.81	2.14	2.58	3.29	3.95
Ann	23.01	25.28	28.21	30.47	32.49	34.46	36.50	38.78	41.56	45.64	49.19

\+ 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: 1897-2001
(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	9.1	7.9	3	2
Feb	6.1	5.8	3	2
Mar	3.8	3.9	1	#
Apr	1.6	.0	#	0
May	.1	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.0	.0	0	0
Oct	.1	.0	#	0
Nov	2.1	.5	#	0
Dec	6.4	6.0	1	1
Ann	29.3	24.1	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	8.0	1985	1	23.0	1979	24	1979	24	17	1979
Feb	7.5	1983	3	16.1	1975	21	1979	20	19	1979
Mar	7.5	1975	7	13.5	1975	10	1979	3	8	1979
Apr	12.6	1973	9	16.2	1973	12	1973	9	1	1973
May	1.5	1994	1	1.5	1994	#	1997	1	#	1997
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	2.5	1997	27	2.5	1997	#	1972	16	#	1972
Nov	6.5	1997	15	7.5	1971	6+	1997	17	2	1997
Dec	8.0	1987	15	14.0	1977	10	1977	12	5	1977
Ann	12.6	Apr 1973	9	23.0	Jan 1979	24	Jan 1979	24	19	Feb 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	4.8	3.2	.9	.3	.0
Feb	3.7	1.7	.5	.2	.0
Mar	2.0	1.2	.5	.1	.0
Apr	.6	.4	.2	.1	@
May	@	@	.0	.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	.0	.0	.0
Nov	1.4	.9	.3	.1	.0
Dec	3.7	2.6	.8	.2	.0
Ann	16.3	10.1	3.2	1.0	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	15.7	10.4	7.4	.0
Feb	12.3	5.7	2.7	.0
Mar	2.8	1.8	.9	.1
Apr	.4	.2	.1	.1
May	.0	.0	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.0	.0	.0	.0
Oct	.0	.0	.0	.0
Nov	1.8	.7	.3	.0
Dec	12.0	8.0	4.1	.4
Ann	45.0	26.8	15.5	.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	5/26	5/21	5/17	5/14	5/11	5/08	5/05	5/01	4/26
32	5/17	5/12	5/08	5/04	5/01	4/27	4/24	4/20	4/14
28	5/03	4/27	4/24	4/20	4/17	4/14	4/11	4/07	4/02
24	4/18	4/14	4/12	4/10	4/07	4/05	4/03	4/01	3/28
20	4/15	4/09	4/06	4/02	3/30	3/27	3/24	3/20	3/15
16	4/07	3/31	3/27	3/23	3/19	3/15	3/11	3/07	2/28

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	9/12	9/16	9/19	9/21	9/24	9/26	9/29	10/02	10/06
32	9/20	9/24	9/27	9/30	10/02	10/05	10/07	10/10	10/15
28	10/01	10/06	10/10	10/13	10/16	10/19	10/22	10/26	10/31
24	10/10	10/15	10/19	10/23	10/26	10/29	11/02	11/06	11/12
20	10/21	10/26	10/29	11/01	11/04	11/07	11/10	11/13	11/18
16	11/04	11/09	11/12	11/15	11/18	11/20	11/23	11/27	12/01

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	148	143	139	135	131	127	122	115
32	174	167	162	158	154	150	146	141	134
28	204	196	190	185	181	177	172	166	158
24	220	213	209	205	201	197	193	189	182
20	242	233	228	223	218	213	208	202	194
16	269	260	254	248	243	238	232	226	217

***** 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	1478	1179	931	525	224	26	8	26	136	458	879	1293	7163
60	1323	1039	776	383	130	5	0	5	57	317	729	1138	5902
57	1230	955	683	304	87	2	0	1	29	242	640	1045	5218
55	1168	899	622	255	64	1	0	0	16	198	581	983	4787
50	1013	764	479	152	25	0	0	0	3	108	440	829	3813
32	499	330	107	4	0	0	0	0	0	2	85	346	1373

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	44	75	200	470	848	1118	1270	1198	899	570	196	77	6965
55	0	0	2	32	199	429	557	485	225	53	2	0	1984
57	0	0	0	21	159	370	495	424	177	35	1	0	1682
60	0	0	0	10	109	284	402	335	115	17	0	0	1272
65	0	0	0	2	49	154	255	201	44	4	0	0	709
70	0	0	0	0	16	62	130	101	11	0	0	0	320

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	1	9	81	280	621	881	1028	961	682	352	80	7	1	10	91	371	992	1873	2901	3862	4544	4896	4976	4983
45	0	1	39	171	469	731	873	806	533	227	37	3	0	1	40	211	680	1411	2284	3090	3623	3850	3887	3890
50	0	0	17	92	324	581	718	651	387	132	16	1	0	0	17	109	433	1014	1732	2383	2770	2902	2918	2919
55	0	0	6	46	199	435	563	496	257	65	3	0	0	0	6	52	251	686	1249	1745	2002	2067	2070	2070
60	0	0	1	17	108	289	409	342	149	24	0	0	0	0	1	18	126	415	824	1166	1315	1339	1339	1339
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	3	55	181	382	579	695	638	430	220	51	5	0	3	58	239	621	1200	1895	2533	2963	3183	3234	3239

(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