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: STORM LAKE 2 E, IA **COOP ID: 137979**

Climate Division: IA 1 **NWS Call Sign:** **Elevation: 1,425 Feet** **Lat: 42˚38N** **Lon: 95˚10W**

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	24.5	5.6	15.1	66	1981	25	27.5	1990	-31	1924	5	2.0	1979	1548	0	.0	.0	.6	21.4	30.9	11.4
Feb	30.7	12.4	21.6	66	1976	25	33.2	1987	-34+	1905	2	5.3	1979	1217	0	.0	.0	2.5	15.2	27.5	7.1
Mar	42.8	23.5	33.2	85	1967	25	41.5	2000	-24	1962	2	23.8	1975	988	0	.0	.0	9.8	7.2	26.3	1.5
Apr	57.7	36.0	46.9	93	1980	23	53.3	1981	2+	1975	3	40.4	1983	549	3	.0	.1	21.8	.8	12.1	.0
May	70.1	48.0	59.1	107	1934	30	66.4	1988	20+	1967	2	52.7	1997	244	59	.0	.5	30.4	.0	1.3	.0
Jun	79.4	57.7	68.6	105	1933	10	74.3	1988	34+	1935	7	62.8	1982	39	144	.1	2.7	30.0	.0	.0	.0
Jul	82.7	61.8	72.3	109	1936	4	75.9	1983	42+	1967	4	67.1	1992	10	235	.2	5.0	31.0	.0	.0	.0
Aug	80.5	59.6	70.1	109	1930	3	76.7	1983	36+	1964	13	65.7	1992	32	188	@	2.9	31.0	.0	.0	.0
Sep	73.5	50.7	62.1	101	1913	5	69.3	1998	22	1899	29	57.6	1993	142	55	.0	1.2	29.6	.0	.7	.0
Oct	61.1	38.0	49.6	91	1997	4	54.7	1973	2	1925	29	44.4	1976	479	1	.0	.1	26.1	.2	9.1	.0
Nov	42.4	24.6	33.5	78	1968	1	43.2	1999	-11	1937	21	24.7	1991	946	0	.0	.0	9.7	7.2	24.2	.7
Dec	28.4	11.1	19.8	66+	1998	1	28.9	1998	-29	1917	29	3.4	1983	1403	0	.0	.0	1.3	18.0	30.5	6.8
Ann	56.2	35.8	46.0	109+	Jul 1936	4	76.7	Aug 1983	-34+	Feb 1905	2	2.0	Jan 1979	7597	685	.3	12.5	223.8	70.0	162.6	27.5

\+ 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: 1893-2001

(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	.59	.42	1.02	1982	25	3.56	1975	.00+	1998
Feb	.60	.46	2.22	1954	20	2.89	1971	.00+	1997
Mar	1.99	1.65	1.66	1991	23	5.51	1983	.00	1999
Apr	3.66	2.93	2.38	1999	21	11.59	1999	.20	1996
May	4.14	4.04	4.40	1954	31	7.77	1990	1.50	1994
Jun	5.11	3.99	3.47	1996	21	11.89	1990	1.65	1973
Jul	4.55	4.35	3.74	1900	15	11.46	1992	.56	1975
Aug	4.64	4.59	6.65	1962	31	10.29	1979	.25	1976
Sep	3.49	3.28	6.26	1978	13	8.00	1978	.69	2000
Oct	2.48	2.20	3.54	1914	7	8.38	1998	.31	1975
Nov	1.62	1.38	2.71	1977	9	4.20	1983	.00+	1998
Dec	.71	.63	1.50	1997	10	2.45	1984	.00+	2000
Ann	33.58	34.27	6.65	Aug 1962	31	11.89	Jun 1990	.00+	Dec 2000

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	4.9	1.7	.1	@
Feb	4.9	2.1	.2	@
Mar	7.3	4.5	1.4	.5
Apr	10.3	6.5	2.8	1.0
May	11.7	7.9	2.8	1.0
Jun	10.4	7.3	3.6	1.6
Jul	9.4	6.6	2.9	1.4
Aug	8.8	6.3	3.0	1.2
Sep	8.2	5.7	2.2	1.0
Oct	7.4	4.5	1.8	.7
Nov	6.7	3.5	1.0	.3
Dec	5.6	2.1	.5	.1
Ann	95.6	58.7	22.3	8.8

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	.00	.00	.09	.18	.28	.40	.54	.73	.97	1.40	1.82
Feb	.00	.04	.13	.23	.33	.44	.58	.74	.98	1.36	1.75
Mar	.07	.22	.51	.79	1.11	1.47	1.90	2.44	3.18	4.43	5.66
Apr	.45	.74	1.25	1.77	2.31	2.91	3.61	4.47	5.65	7.58	9.45
May	1.66	2.04	2.58	3.03	3.45	3.87	4.33	4.86	5.54	6.57	7.51
Jun	1.52	2.01	2.73	3.36	3.97	4.61	5.31	6.13	7.19	8.86	10.41
Jul	.92	1.33	2.00	2.61	3.23	3.89	4.63	5.53	6.72	8.62	10.43
Aug	1.02	1.45	2.13	2.75	3.36	4.02	4.75	5.64	6.80	8.65	10.40
Sep	.68	1.00	1.51	1.98	2.46	2.97	3.55	4.25	5.18	6.67	8.09
Oct	.46	.68	1.04	1.38	1.72	2.09	2.51	3.02	3.69	4.78	5.82
Nov	.00	.12	.39	.64	.91	1.21	1.57	2.00	2.61	3.62	4.60
Dec	.00	.00	.14	.30	.44	.59	.74	.92	1.17	1.53	1.92
Ann	19.79	22.27	25.54	28.10	30.42	32.70	35.09	37.77	41.08	45.98	50.29

\+ 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: 1893-2001
(3) Derived from 1971-2000 serially complete daily data

Complete documentation available from:
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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	5.8	4.3	4	3	7.0	1994	2	19.0	1979	27	1979	31	15	1979	4.0	2.4	.8	.2	.0	22.2	15.6	9.7	2.7
Feb	6.4	6.4	4	2	13.0	1993	21	13.8	1983	33	1979	26	31	1979	3.2	2.1	.7	.2	@	17.5	11.1	6.7	3.4
Mar	6.3	5.5	2	1	12.5	1977	3	22.0	1983	32	1979	6	18	1979	2.4	1.8	.7	.2	.1	7.2	4.9	2.9	.6
Apr	2.2	.5	#	#	7.5	1983	14	18.0	1983	8	1985	1	2	1983	1.2	.7	.2	.1	.0	1.3	.6	.3	.0
May	#	.0	#	0	#	1989	6	#	1989	2	1984	1	#+	1996	.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	.5	1985	30	.5	1985	0	0	0	0	0	@	.0	.0	.0	.0	.0	.0	.0	.0
Oct	.4	.0	#	0	3.5	1981	25	3.5	1981	2+	1991	31	#+	1991	.3	.1	@	.0	.0	.2	.0	.0	.0
Nov	4.7	3.0	1	#	12.0	1983	28	19.1	1983	13	1983	30	4	1991	2.3	1.5	.4	.1	@	5.2	2.6	2.0	.1
Dec	6.8	6.5	3	2	10.0	1982	28	13.5+	1984	22	1985	23	19	1985	3.6	2.3	.6	.2	@	17.1	10.6	6.5	3.4
Ann	32.6	26.2	N/A	N/A	13.0	Feb 1993	21	22.0	Mar 1983	33	Feb 1979	26	31	Feb 1979	17.0	10.9	3.4	1.0	.1	70.7	45.4	28.1	10.2

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

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	9/24	9/27	9/29	10/02	10/05	10/09
32	9/22	9/27	10/01	10/04	10/07	10/09	10/12	10/16	10/21
28	9/29	10/04	10/08	10/11	10/14	10/17	10/20	10/24	10/30
24	10/13	10/18	10/21	10/24	10/27	10/30	11/02	11/06	11/11
20	10/24	10/29	11/01	11/04	11/07	11/09	11/12	11/15	11/20
16	10/29	11/03	11/07	11/11	11/14	11/17	11/21	11/25	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	163	157	152	148	144	141	137	132	126
32	180	173	168	164	160	156	151	146	139
28	201	194	188	184	179	175	170	165	157
24	222	215	210	206	203	199	195	190	183
20	236	230	227	223	220	217	214	210	205
16	258	250	245	240	236	231	227	221	214

***** 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	1548	1217	988	549	244	39	10	32	142	479	946	1403	7597
60	1393	1077	833	407	151	10	0	8	62	329	796	1248	6314
57	1300	993	740	329	106	4	0	2	32	249	706	1155	5616
55	1238	937	679	280	82	2	0	0	19	200	647	1093	5177
50	1083	806	535	175	37	0	0	0	3	103	508	939	4189
32	567	374	142	7	0	0	0	0	0	2	134	441	1667

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	42	81	177	452	838	1095	1248	1179	903	547	178	60	6800
55	0	0	1	35	207	407	535	467	232	32	2	0	1918
57	0	0	0	24	169	349	473	407	186	19	0	0	1627
60	0	0	0	12	121	265	380	319	126	6	0	0	1229
65	0	0	0	3	59	144	235	188	55	1	0	0	685
70	0	0	0	0	24	59	117	93	17	0	0	0	310

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	6	60	249	590	852	1004	930	658	324	56	2	0	6	66	315	905	1757	2761	3691	4349	4673	4729	4731
45	0	1	28	147	437	702	849	775	509	206	22	0	0	1	29	176	613	1315	2164	2939	3448	3654	3676	3676
50	0	0	7	80	296	552	694	620	370	112	8	0	0	0	7	87	383	935	1629	2249	2619	2731	2739	2739
55	0	0	1	37	180	405	539	466	241	53	0	0	0	0	1	38	218	623	1162	1628	1869	1922	1922	1922
60	0	0	0	14	91	265	385	313	136	17	0	0	0	0	0	14	105	370	755	1068	1204	1221	1221	1221
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	6	46	160	352	550	672	609	408	201	42	0	0	6	52	212	564	1114	1786	2395	2803	3004	3046	3046

(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