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: CHARLES CITY, IA **COOP ID: 131402**

Climate Division: IA 2 **NWS Call Sign:** **Elevation: 1,013 Feet** **Lat: 43˚02N** **Lon: 92˚40W**

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	25.0	6.3	15.7	59	1981	25	27.5	1990	-31+	1963	15	3.6	1979	1530	0	.0	.0	.3	22.1	30.9	10.9
Feb	31.4	13.0	22.2	65	1981	17	32.3	1998	-32	1996	2	10.6	1979	1198	0	.0	.0	1.6	14.2	27.2	6.1
Mar	44.2	24.7	34.5	85	1986	29	42.3	1973	-32	1962	1	25.0	1975	947	0	.0	.0	9.2	5.8	24.5	1.4
Apr	59.9	36.3	48.1	94	1980	22	55.7	1977	3	1982	6	42.0	1975	511	4	.0	.1	23.4	.3	10.4	.0
May	72.3	48.1	60.2	94	1967	26	68.4	1977	24	1989	6	53.6	1997	210	60	.0	.6	30.8	.0	.8	.0
Jun	81.2	57.4	69.3	102+	1985	8	74.2	1971	36	1993	1	64.4	1982	29	158	.1	3.1	30.0	.0	.0	.0
Jul	84.1	61.2	72.7	102	1988	31	76.6	1974	44+	2000	22	66.7	1992	10	247	.1	5.5	31.0	.0	.0	.0
Aug	81.9	59.0	70.5	104	1988	17	76.7	1983	38	1967	31	64.8	1992	26	194	.2	3.2	31.0	.0	.0	.0
Sep	74.6	50.1	62.4	99	1955	9	67.6	1978	25	1974	22	56.0	1993	130	50	.0	1.2	29.8	.0	.9	.0
Oct	62.3	38.7	50.5	95	1963	5	57.2	1973	10	1988	30	43.9	1988	451	2	.0	.1	27.3	.1	8.7	.0
Nov	43.2	25.5	34.4	78	1999	8	41.8	1999	-14	1977	26	26.6	1996	920	0	.0	.0	8.9	5.7	22.9	.8
Dec	29.1	12.2	20.7	63+	1962	1	28.7	1979	-29	2000	25	7.1	2000	1375	0	.0	.0	.7	18.8	30.4	6.6
Ann	57.4	36.0	46.8	104	Aug 1988	17	76.7	Aug 1983	-32+	Feb 1996	2	3.6	Jan 1979	7337	715	.4	13.8	224.0	67.0	156.7	25.8

\+ 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

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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	.93	.80	1.40	1971	4	1.99	1980	.08	1976
Feb	.87	.78	1.14	1951	25	2.84	1971	.00	1987
Mar	2.01	1.95	1.75	1966	23	4.40	1990	.25	1994
Apr	3.41	3.27	3.06	1976	18	7.70	1991	.66	1997
May	4.08	3.73	3.55	1963	10	8.62	1983	1.56	1985
Jun	5.19	5.45	3.57	1985	27	10.09	2000	1.66	1988
Jul	4.61	4.24	6.65	1999	21	18.48	1999	.80	1985
Aug	4.57	3.54	6.30	1980	10	13.60	1979	.88	1971
Sep	3.36	2.73	5.18	1972	25	11.77	1972	.60	1975
Oct	2.45	2.41	3.22	1970	9	4.44	1972	.41	1987
Nov	2.13	2.00	2.78	1991	1	5.34	1991	.00	1976
Dec	1.08	.88	1.35	1948	5	3.19	1982	.21	1998
Ann	34.69	34.72	6.65	Jul 1999	21	18.48	Jul 1999	.00+	Feb 1987

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	7.2	3.0	.2	@
Feb	6.1	2.6	.4	@
Mar	8.8	4.8	1.2	.3
Apr	10.3	7.4	2.0	.5
May	11.6	7.7	2.9	1.0
Jun	10.9	7.4	3.7	1.4
Jul	9.7	6.3	2.8	1.2
Aug	9.9	6.8	2.8	1.2
Sep	8.8	5.8	2.4	.6
Oct	8.2	5.3	1.6	.4
Nov	7.7	4.6	1.2	.5
Dec	7.2	3.1	.5	@
Ann	106.4	64.8	21.7	7.1

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	.20	.29	.42	.55	.67	.80	.95	1.12	1.36	1.73	2.08
Feb	.06	.14	.28	.41	.54	.69	.86	1.07	1.36	1.83	2.28
Mar	.53	.72	1.01	1.27	1.52	1.78	2.08	2.43	2.88	3.60	4.27
Apr	1.05	1.37	1.86	2.27	2.67	3.09	3.55	4.09	4.78	5.87	6.87
May	1.52	1.90	2.45	2.91	3.34	3.78	4.27	4.83	5.54	6.64	7.64
Jun	1.97	2.46	3.15	3.73	4.27	4.83	5.44	6.14	7.03	8.40	9.65
Jul	.89	1.31	1.99	2.61	3.24	3.92	4.69	5.62	6.85	8.82	10.70
Aug	.89	1.30	1.97	2.59	3.22	3.89	4.65	5.56	6.78	8.73	10.58
Sep	.62	.92	1.41	1.87	2.33	2.83	3.40	4.09	5.00	6.47	7.87
Oct	.67	.90	1.26	1.56	1.87	2.18	2.53	2.95	3.48	4.33	5.12
Nov	.21	.45	.81	1.12	1.43	1.77	2.16	2.63	3.25	4.25	5.21
Dec	.23	.33	.49	.63	.78	.93	1.10	1.31	1.58	2.02	2.43
Ann	22.33	24.63	27.62	29.93	32.00	34.03	36.13	38.48	41.35	45.56	49.24

\+ 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)

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median
Jan	10.1	8.7	6	5
Feb	6.7	6.2	7	5
Mar	5.9	5.8	2	1
Apr	3.0	1.4	#	#
May	.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	.0	#	0
Nov	4.5	4.0	1	#
Dec	8.2	7.8	4	3
Ann	38.5	33.9	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	13.0	1971	4	24.0	1996	31	1979	31	20	1979
Feb	9.0	1997	4	19.0	1994	33	1979	14	30	1979
Mar	9.0	1971	19	15.1	1975	18	1979	1	8	1979
Apr	6.5	1973	10	14.0	1973	11	1973	10	1	1982
May	.1	1997	1	.1	1997	#	1989	6	#	1989
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	1.0	1981	25	1.0+	1991	1	1972	18	#+	1995
Nov	6.2	1992	26	12.7	1985	11	1986	20	3	1991
Dec	7.5	1985	1	24.5	2000	24	1985	22	21	1985
Ann	13.0	Jan 1971	4	24.5	Dec 2000	33	Feb 1979	14	30	Feb 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	4.5	2.3	.5	.2	.0
Feb	2.8	1.9	.7	.2	.0
Mar	2.2	1.6	.6	.3	@
Apr	.9	.7	.2	.0	.0
May	.0	.0	.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	.3	.1	.0	.0	.0
Nov	2.5	1.5	.6	.2	@
Dec	3.9	2.5	.8	.2	@
Ann	17.1	10.6	3.4	1.1	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	20.4	14.0	8.5	.8
Feb	9.4	5.1	2.6	1.5
Mar	3.9	2.1	1.2	.0
Apr	.7	.2	.1	.0
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	.1	.0	.0	.0
Nov	4.7	1.9	1.2	.2
Dec	14.5	8.6	3.7	.1
Ann	53.7	31.9	17.3	2.6

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

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	9/11	9/15	9/18	9/20	9/23	9/25	9/27	9/30	10/04
32	9/20	9/24	9/27	9/30	10/02	10/04	10/07	10/10	10/14
28	9/24	9/29	10/03	10/07	10/10	10/13	10/17	10/21	10/27
24	10/07	10/13	10/18	10/21	10/25	10/28	11/01	11/05	11/11
20	10/19	10/24	10/28	10/31	11/03	11/06	11/09	11/13	11/18
16	10/26	11/01	11/06	11/09	11/13	11/16	11/20	11/24	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	153	147	142	138	134	130	126	121	114
32	173	167	163	159	155	152	148	144	138
28	200	193	187	183	179	174	170	165	157
24	222	215	209	205	200	196	191	186	179
20	243	234	229	224	219	214	209	203	195
16	261	252	245	239	234	229	223	216	207

***** 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	1530	1198	947	511	210	29	10	26	130	451	920	1375	7337
60	1375	1058	792	372	121	6	0	5	54	307	770	1220	6080
57	1282	974	700	297	81	2	0	1	27	232	681	1127	5404
55	1220	918	640	250	59	1	0	0	15	187	622	1065	4977
50	1065	782	497	151	23	0	0	0	2	98	482	911	4011
32	545	346	120	5	0	0	0	0	0	2	114	415	1547

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	38	72	196	488	874	1119	1260	1191	910	576	184	62	6970
55	0	0	3	43	220	430	547	478	235	48	2	0	2006
57	0	0	1	29	179	371	485	417	187	31	0	0	1700
60	0	0	0	15	127	285	392	328	124	14	0	0	1285
65	0	0	0	4	60	158	247	194	50	2	0	0	715
70	0	0	0	0	22	66	127	95	13	0	0	0	323

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	5	67	276	628	881	1019	951	678	346	61	3	0	5	72	348	976	1857	2876	3827	4505	4851	4912	4915
45	0	1	28	171	476	731	864	796	529	220	25	1	0	1	29	200	676	1407	2271	3067	3596	3816	3841	3842
50	0	0	11	90	329	581	709	641	385	124	6	0	0	0	11	101	430	1011	1720	2361	2746	2870	2876	2876
55	0	0	3	46	203	432	554	486	253	56	2	0	0	0	3	49	252	684	1238	1724	1977	2033	2035	2035
60	0	0	0	19	109	288	399	332	147	19	0	0	0	0	0	19	128	416	815	1147	1294	1313	1313	1313
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	1	45	174	386	578	687	630	429	215	35	1	0	1	46	220	606	1184	1871	2501	2930	3145	3180	3181

(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