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: CARROLL, IA **COOP ID: 131233**

Climate Division: IA 4 **NWS Call Sign:** **Elevation: 1,240 Feet** **Lat: 42˚04N** **Lon: 94˚51W**

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	27.8	7.3	17.6	63+	1981	24	29.6	1990	-30	1974	12	6.1	1982	1470	0	.0	.0	1.1	19.1	30.5	9.2
Feb	33.8	12.9	23.4	69	1999	11	34.1	1976	-31	1958	17	10.2	1979	1167	0	.0	.0	3.7	13.0	26.4	5.1
Mar	46.3	23.5	34.9	88	1986	29	42.3	2000	-28	1962	1	26.4	1975	933	0	.0	.0	12.0	4.4	23.2	1.0
Apr	60.5	34.9	47.7	94	1980	22	54.6	1977	4	1975	3	40.5	1983	522	3	.0	.2	23.7	.4	9.9	.0
May	72.4	48.1	60.3	102	1967	25	67.4	1977	20	1961	2	54.7	1997	204	57	.0	.9	30.8	.0	1.2	.0
Jun	82.1	57.8	70.0	102+	1977	10	74.3	1971	33	1969	3	65.1	1982	22	170	.3	5.5	30.0	.0	.0	.0
Jul	85.7	62.7	74.2	105	1955	31	78.4	1974	39	1972	5	68.2	1992	6	291	.6	8.9	31.0	.0	.0	.0
Aug	83.4	60.7	72.1	103	1976	10	78.4	1983	35	1971	27	66.1	1992	19	237	.1	5.8	31.0	.0	.0	.0
Sep	76.1	50.3	63.2	101	2000	3	69.6	1978	24+	1956	30	57.2	1993	121	67	@	2.2	29.9	.0	1.1	.0
Oct	63.3	38.1	50.7	93	1953	2	55.7	1973	9	1960	20	46.0	1988	446	3	.0	.2	27.1	.1	7.8	.0
Nov	45.2	24.8	35.0	78+	1953	16	44.7	1999	-10+	1952	28	25.6	1991	900	0	.0	.0	10.7	5.1	22.7	.5
Dec	31.7	12.6	22.2	67	1998	2	29.4	1998	-24	1989	22	8.6	2000	1329	0	.0	.0	2.0	15.6	30.0	5.7
Ann	59.0	36.1	47.6	105	Jul 1955	31	78.4+	Aug 1983	-31	Feb 1958	17	6.1	Jan 1982	7139	828	1.0	23.7	233.0	57.7	152.8	21.5

\+ 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: 1948-2001

(3) Derived from 1971-2000 serially complete daily data

Issue Date: February 2004

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: CARROLL, IA **COOP ID: 131233**

Climate Division: IA 4 **NWS Call Sign:** **Elevation: 1,240 Feet** **Lat: 42˚04N** **Lon: 94˚51W**

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	.89	.84	.98	1982	22	2.42	1982	.00	1987
Feb	.86	.77	1.27	1999	23	2.53	1971	.06	1996
Mar	2.28	2.14	1.98	1952	22	5.50	1991	.15	1994
Apr	3.40	2.83	2.81	1973	25	11.55	1984	.71	2000
May	4.36	3.68	4.21	1976	23	9.13	1976	1.22	1994
Jun	4.55	4.26	3.40	1957	14	10.45	1990	.56	1976
Jul	4.85	3.86	6.87	1993	9	14.31	1973	.60	1975
Aug	3.66	3.25	4.00	1986	13	10.04	1987	.44	1971
Sep	3.30	2.95	4.85	1973	26	8.09	1973	.46	1976
Oct	2.49	2.23	2.88	1986	11	5.36	1986	.08	1975
Nov	1.72	1.67	1.64+	1956	5	3.90	1983	.00	1976
Dec	.97	.88	1.50	1982	27	2.83	1982	.17	1989
Ann	33.33	33.24	6.87	Jul 1993	9	14.31	Jul 1973	.00+	Jan 1987

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	6.1	2.3	.5	.0
Feb	5.5	2.5	.3	@
Mar	7.8	5.1	1.6	.5
Apr	9.6	6.4	2.5	.8
May	11.3	8.1	2.9	1.0
Jun	9.7	6.8	3.3	1.4
Jul	9.1	6.4	2.9	1.2
Aug	8.7	6.1	2.5	.8
Sep	8.3	5.4	2.2	.7
Oct	6.8	4.7	1.8	.6
Nov	6.6	4.0	1.3	.3
Dec	6.5	2.9	.2	@
Ann	96.0	60.7	22.0	7.3

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	.04	.12	.26	.39	.53	.68	.86	1.09	1.40	1.91	2.41
Feb	.16	.24	.36	.48	.60	.73	.87	1.05	1.28	1.66	2.02
Mar	.34	.53	.86	1.17	1.50	1.86	2.28	2.79	3.47	4.58	5.65
Apr	.71	1.02	1.52	1.97	2.43	2.92	3.47	4.14	5.01	6.42	7.75
May	1.46	1.87	2.48	2.99	3.48	3.99	4.55	5.20	6.04	7.33	8.53
Jun	1.21	1.64	2.29	2.87	3.44	4.04	4.70	5.49	6.51	8.12	9.63
Jul	.77	1.19	1.89	2.56	3.25	4.00	4.87	5.92	7.33	9.61	11.80
Aug	.74	1.07	1.61	2.10	2.60	3.13	3.73	4.45	5.41	6.94	8.40
Sep	.46	.74	1.21	1.67	2.15	2.68	3.29	4.04	5.05	6.69	8.28
Oct	.39	.60	.96	1.31	1.66	2.05	2.49	3.03	3.76	4.94	6.07
Nov	.25	.47	.76	1.01	1.25	1.50	1.78	2.12	2.56	3.26	3.92
Dec	.26	.35	.49	.61	.73	.86	1.00	1.17	1.39	1.73	2.05
Ann	22.03	24.15	26.91	29.02	30.92	32.76	34.68	36.81	39.41	43.21	46.53

\+ 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

Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data,
and Information Services

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: CARROLL, IA **COOP ID: 131233**

Climate Division: IA 4 **NWS Call Sign:** **Elevation: 1,240 Feet** **Lat: 42°04N** **Lon: 94°51W**

Snow (inches)

Snow Totals

Means/Medians (1)

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median
Jan	6.5	5.5	3	2
Feb	6.4	5.8	3	2
Mar	4.9	4.6	1	#
Apr	2.2	.0	#	#
May	#	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	#	.0	0	0
Oct	.5	.0	#	0
Nov	3.4	3.5	#	#
Dec	6.5	7.0	2	1
Ann	30.4	26.4	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	1971	4	16.7	1973	18	1982	24	12	1979
Feb	10.5	1997	4	13.9	1999	19	1979	18	15	1979
Mar	10.0	1999	9	16.8	1984	16	1999	9	4	1979
Apr	7.0	1973	9	15.0	1983	9	1973	10	1	1997
May	#	1997	1	#	1997	#	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	#	1985	29	#	1985	0	0	0	0	0
Oct	4.0	1979	23	4.0	1979	2+	1997	26	#+	1997
Nov	6.0	1983	28	12.7	1983	8	1983	30	3	1991
Dec	6.0	1994	7	11.5	1994	14	1983	31	10	1983
Ann	10.5	Feb 1997	4	16.8	Mar 1984	19	Feb 1979	18	15	Feb 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	6.3	2.8	1.0	.3	.1
Feb	4.6	2.3	.8	.2	@
Mar	2.9	1.5	.4	.2	.0
Apr	.9	.6	.2	.1	.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	.1	.0	.0	.0	.0
Nov	1.7	.8	.4	.1	.0
Dec	5.1	2.7	.8	.2	@
Ann	21.6	10.7	3.6	1.1	.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	18.4	12.6	8.5	1.0
Feb	16.7	13.1	8.9	2.6
Mar	6.1	3.5	2.1	.4
Apr	1.0	.5	.3	.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	2.6	1.4	.5	.0
Dec	14.5	9.2	5.2	.5
Ann	59.3	40.3	25.5	4.6

+ 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

Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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: CARROLL, IA **COOP ID: 131233**

Climate Division: IA 4 **NWS Call Sign:** **Elevation: 1,240 Feet** **Lat: 42˚04N** **Lon: 94˚51W**

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	5/24	5/19	5/16	5/13	5/10	5/07	5/05	5/01	4/26
32	5/15	5/10	5/07	5/04	5/01	4/28	4/25	4/22	4/17
28	5/05	4/29	4/26	4/22	4/19	4/16	4/13	4/09	4/04
24	4/19	4/15	4/13	4/10	4/08	4/06	4/04	4/01	3/28
20	4/16	4/11	4/07	4/04	4/02	3/30	3/27	3/23	3/18
16	4/04	3/30	3/27	3/24	3/22	3/19	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	9/11	9/15	9/18	9/20	9/23	9/25	9/28	9/30	10/05
32	9/14	9/19	9/24	9/27	9/30	10/04	10/07	10/11	10/17
28	9/24	9/30	10/04	10/08	10/12	10/16	10/20	10/24	10/30
24	10/10	10/15	10/19	10/22	10/25	10/28	10/31	11/04	11/09
20	10/17	10/23	10/27	10/31	11/03	11/07	11/10	11/15	11/21
16	10/28	11/03	11/07	11/10	11/14	11/17	11/21	11/25	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	156	149	144	139	135	131	126	121	113
32	175	167	161	156	152	147	142	137	129
28	198	190	185	180	175	170	165	160	152
24	216	210	206	202	199	195	192	187	181
20	236	229	223	219	215	211	206	201	194
16	259	251	246	241	237	232	228	222	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

Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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: CARROLL, IA **COOP ID: 131233**

Climate Division: IA 4 **NWS Call Sign:** **Elevation: 1,240 Feet** **Lat: 42˚04N** **Lon: 94˚51W**

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	1470	1167	933	522	204	22	6	19	121	446	900	1329	7139
60	1315	1027	778	381	115	4	0	3	51	303	750	1174	5901
57	1222	943	685	304	76	1	0	0	26	229	662	1081	5229
55	1160	887	624	256	55	0	0	0	15	184	604	1019	4804
50	1007	758	480	154	21	0	0	0	2	96	467	865	3850
32	504	336	106	4	0	0	0	0	0	2	111	375	1438

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	56	94	197	476	876	1138	1308	1240	936	581	201	69	7172
55	0	0	1	37	219	448	595	527	260	50	4	0	2141
57	0	0	0	25	177	389	533	466	211	33	2	0	1836
60	0	0	0	12	123	302	440	376	146	15	0	0	1414
65	0	0	0	3	57	170	291	237	67	3	0	0	828
70	0	0	0	0	20	72	158	126	22	0	0	0	398

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	14	88	298	647	913	1062	989	708	367	73	5	0	14	102	400	1047	1960	3022	4011	4719	5086	5159	5164
45	0	0	41	187	494	763	907	834	558	241	33	2	0	0	41	228	722	1485	2392	3226	3784	4025	4058	4060
50	0	0	17	107	349	613	752	679	415	142	14	0	0	0	17	124	473	1086	1838	2517	2932	3074	3088	3088
55	0	0	4	52	219	465	597	524	284	74	3	0	0	0	4	56	275	740	1337	1861	2145	2219	2222	2222
60	0	0	0	24	121	318	443	369	169	30	0	0	0	0	0	24	145	463	906	1275	1444	1474	1474	1474
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	0	16	70	198	401	595	716	660	452	232	52	2	0	16	86	284	685	1280	1996	2656	3108	3340	3392	3394

(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:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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