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: MOUNT AYR 4 SW, IA **COOP ID: 135769**

Climate Division: IA 8 **NWS Call Sign:** **Elevation: 1,240 Feet** **Lat: 40˚41N** **Lon: 94˚18W**

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	30.5	11.2	20.9	67	1989	31	32.3	1989	-30	1912	12	7.8	1979	1370	0	.0	.0	2.4	15.8	30.1	6.8
Feb	36.7	16.3	26.5	80	1930	24	37.0	1998	-29	1996	3	13.1	1979	1079	0	.0	.0	5.8	10.7	25.4	3.7
Mar	49.0	27.3	38.2	90	1907	25	43.9	1973	-20	1960	5	30.0	1975	832	0	.0	.0	15.6	3.3	20.6	.5
Apr	61.0	38.3	49.7	92	1910	29	56.3	1981	5	1920	5	43.0	1983	465	4	.0	@	25.3	.1	7.8	.0
May	71.0	50.2	60.6	103	1934	30	67.4	1977	22	1903	3	53.9	1997	195	58	.0	.1	30.8	.0	.4	.0
Jun	80.4	59.8	70.1	105	1933	6	74.4	1988	36+	1968	13	65.8	1992	19	172	.2	2.9	30.0	.0	.0	.0
Jul	85.3	64.7	75.0	112	1936	25	80.0	1980	43	1971	30	70.3	1992	4	314	.4	8.9	31.0	.0	.0	.0
Aug	83.5	62.2	72.9	111	1934	9	80.9	1983	37+	1917	10	65.8	1992	20	263	.5	6.9	31.0	.0	.0	.0
Sep	76.0	52.7	64.4	105	1913	5	70.7	1998	24	1899	29	58.5	1993	105	84	.0	2.0	29.9	.0	.5	.0
Oct	64.5	40.9	52.7	93+	1897	1	58.9	1971	0	1925	30	47.0	1976	384	4	.0	.1	28.5	.0	5.7	.0
Nov	47.7	27.9	37.8	82	1938	1	47.0	1999	-15	1964	30	29.3	1991	816	0	.0	.0	14.4	3.3	19.8	.3
Dec	34.4	16.3	25.4	70	1946	8	31.4	1994	-28	1989	24	9.7	1983	1230	0	.0	.0	3.8	11.9	29.1	4.0
Ann	60.0	39.0	49.5	112	Jul 1936	25	80.9	Aug 1983	-30	Jan 1912	12	7.8	Jan 1979	6519	899	1.1	20.9	248.5	45.1	139.4	15.3

\+ 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	.79	.70	1.80	1904	20	2.55	1973	.00+	1986
Feb	1.09	.88	1.51	1911	17	4.48	1997	.18	1979
Mar	2.23	1.91	3.48	1982	19	7.32	1973	.02	1994
Apr	3.05	2.33	4.55	1897	24	7.16	1978	.88	1989
May	4.39	4.46	4.10	1943	15	10.05	1996	1.05	1980
Jun	4.51	4.58	4.08	1974	9	8.45	1993	.05	1988
Jul	4.55	3.59	5.50	1990	20	19.11	1993	.32	1983
Aug	4.04	3.63	5.15	1932	1	10.64	1977	.75	1998
Sep	3.63	2.95	5.00	1914	14	9.82	1986	.41	1990
Oct	2.80	2.49	4.00	1974	31	7.89	1977	.00	1999
Nov	2.17	1.91	6.22	1952	17	4.86	1992	.00	1989
Dec	1.37	1.16	1.90	1980	8	4.36	2000	.00	1996
Ann	34.62	34.03	6.22	Nov 1952	17	19.11	Jul 1993	.00+	Oct 1999

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	4.5	2.6	.3	.0
Feb	4.5	3.0	.6	.1
Mar	6.7	4.7	1.4	.5
Apr	7.9	6.3	2.2	.6
May	9.8	7.5	3.2	1.0
Jun	8.2	6.6	3.2	1.4
Jul	7.4	6.3	3.1	1.5
Aug	7.8	5.9	2.6	1.3
Sep	6.5	5.3	2.5	1.3
Oct	5.7	4.5	1.6	.8
Nov	5.8	4.5	1.5	.4
Dec	5.1	3.3	.6	.2
Ann	79.9	60.5	22.8	9.1

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	.00	.00	.30	.44	.57	.70	.84	1.01	1.22	1.56	1.87
Feb	.16	.25	.41	.56	.72	.89	1.09	1.33	1.65	2.18	2.69
Mar	.18	.34	.63	.94	1.28	1.67	2.13	2.71	3.52	4.86	6.19
Apr	.83	1.12	1.56	1.94	2.32	2.72	3.16	3.67	4.35	5.41	6.40
May	1.12	1.53	2.17	2.73	3.29	3.88	4.53	5.30	6.31	7.91	9.41
Jun	.89	1.29	1.95	2.56	3.18	3.84	4.58	5.49	6.68	8.59	10.41
Jul	.63	1.01	1.66	2.29	2.96	3.68	4.53	5.56	6.96	9.24	11.45
Aug	1.08	1.46	2.04	2.56	3.06	3.59	4.18	4.87	5.78	7.20	8.54
Sep	.76	1.09	1.62	2.11	2.60	3.12	3.71	4.41	5.35	6.84	8.25
Oct	.11	.34	.75	1.16	1.61	2.11	2.70	3.45	4.47	6.17	7.84
Nov	.27	.54	.91	1.21	1.52	1.85	2.23	2.67	3.26	4.19	5.08
Dec	.18	.36	.59	.79	.98	1.18	1.41	1.69	2.05	2.62	3.16
Ann	21.35	23.78	26.97	29.44	31.66	33.84	36.12	38.67	41.81	46.42	50.47

\+ 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

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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	3.8	4.5	1	#	10.0	1996	27	10.0	1996	12	1996	29	4	1996	2.2	1.6	.5	.1	@	4.1	1.5	.6	.3
Feb	3.6	3.0	1	#	5.0	1975	17	14.0	1978	10	1996	6	5	1971	2.0	1.6	.6	.2	.0	4.3	1.7	.2	.0
Mar	3.2	2.0	#	#	7.0	1998	9	13.0	1998	12	1998	12	3	1998	1.4	1.1	.3	.2	.0	1.5	.9	.4	.2
Apr	.7	.0	#	0	8.0	1980	12	8.0	1980	12	1997	10	1	1997	.3	.2	.1	@	.0	.1	@	.0	.0
May	#	.0	#	0	#	1997	1	#	1997	#	1997	1	#	1997	.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	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Oct	.4	.0	#	0	6.5	1997	26	6.5	1997	7	1997	26	#	1997	.1	.1	.1	@	.0	@	@	@	.0
Nov	.7	.0	#	#	5.5	1972	14	5.5	1972	6	1972	14	1	1992	.5	.3	.1	@	.0	.7	.4	.1	.0
Dec	2.9	2.5	1	#	8.0	1995	7	8.0	1995	16	2000	31	10	2000	2.0	1.5	.6	.1	.0	5.6	3.1	1.8	1.0
Ann	15.3	12.0	N/A	N/A	10.0	Jan 1996	27	14.0	Feb 1978	16	Dec 2000	31	10	Dec 2000	8.5	6.4	2.3	.6	@	16.3	7.6	3.1	1.5

+ 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	5/17	5/11	5/07	5/04	5/01	4/28	4/25	4/21	4/15
32	5/07	5/02	4/29	4/26	4/23	4/21	4/18	4/15	4/10
28	4/24	4/20	4/17	4/14	4/12	4/10	4/07	4/04	3/31
24	4/15	4/11	4/08	4/06	4/04	4/01	3/30	3/27	3/23
20	4/10	4/04	3/31	3/28	3/25	3/21	3/18	3/14	3/09
16	4/02	3/27	3/22	3/19	3/15	3/12	3/08	3/04	2/26

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

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	171	164	159	155	150	146	142	137	129
32	188	181	175	171	167	163	158	153	146
28	212	204	198	193	188	184	179	173	165
24	228	221	216	212	208	204	200	195	188
20	253	245	238	233	228	223	218	212	204
16	276	267	261	255	250	245	239	233	223

***** 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	1370	1079	832	465	195	19	4	20	105	384	816	1230	6519
60	1215	939	677	329	108	3	0	4	41	247	666	1075	5304
57	1122	855	587	255	70	1	0	1	20	177	579	982	4649
55	1060	805	531	210	50	0	0	0	11	136	523	920	4246
50	907	674	391	119	18	0	0	0	1	63	389	772	3334
32	417	278	72	2	0	0	0	0	0	0	76	309	1154

Base — Cooling Degree Days (1)

Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	70	123	263	531	887	1143	1333	1266	969	643	250	103	7581
55	0	6	9	49	223	453	620	553	290	66	8	0	2277
57	0	0	3	34	181	393	558	492	239	44	4	0	1948
60	0	0	0	18	126	306	465	402	170	21	0	0	1508
65	0	0	0	4	58	172	314	263	84	4	0	0	899
70	0	0	0	0	20	71	177	150	32	0	0	0	450

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	3	30	129	346	658	925	1103	1037	754	426	113	13	3	33	162	508	1166	2091	3194	4231	4985	5411	5524	5537
45	0	9	68	227	503	775	948	882	607	291	58	4	0	9	77	304	807	1582	2530	3412	4019	4310	4368	4372
50	0	1	35	135	357	625	793	727	462	176	24	0	0	1	36	171	528	1153	1946	2673	3135	3311	3335	3335
55	0	0	9	70	222	476	638	572	323	90	7	0	0	0	9	79	301	777	1415	1987	2310	2400	2407	2407
60	0	0	3	29	122	329	483	417	208	36	1	0	0	0	3	32	154	483	966	1383	1591	1627	1628	1628
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	2	25	89	212	397	617	753	696	489	261	71	9	2	27	116	328	725	1342	2095	2791	3280	3541	3612	3621

(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

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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