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: ELKADER 5 SSW, IA **COOP ID: 132603**

Climate Division: IA 3 **NWS Call Sign:** **Elevation: 770 Feet** **Lat: 42˚47N** **Lon: 91˚27W**

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	26.8	6.2	16.5	59	1981	25	27.6	1990	-40	1951	30	3.7	1977	1504	0	.0	.0	.4	20.5	30.6	11.0
Feb	33.5	12.3	22.9	66	2000	25	35.3	1998	-47	1996	3	10.5	1978	1179	0	.0	.0	2.2	12.7	26.9	6.5
Mar	45.8	23.5	34.7	87	1986	29	42.4	2000	-31	1962	1	24.2	1975	941	0	.0	.0	10.8	4.3	24.5	1.4
Apr	60.4	34.8	47.6	92+	1952	29	54.5	1977	-1	1975	4	41.0	1975	524	3	.0	.1	24.1	.2	12.9	.1
May	72.1	45.6	58.9	94	1953	30	65.9	1977	23	1976	4	53.5	1997	233	43	.0	.8	30.9	.0	3.1	.0
Jun	80.6	54.7	67.7	103	1988	21	72.2	1971	33+	1964	1	61.4	1982	41	120	.1	3.1	30.0	.0	.0	.0
Jul	84.2	59.6	71.9	104+	1963	1	76.5	1999	35	1984	7	66.7	1992	14	228	.2	7.0	31.0	.0	.0	.0
Aug	82.1	58.0	70.1	106+	1988	3	76.1	1995	33	1964	14	63.9	1992	34	190	.4	4.5	31.0	.0	.0	.0
Sep	74.7	49.1	61.9	102	1955	9	67.4	1978	20	1984	29	56.8	1993	139	45	.0	1.2	29.9	.0	2.1	.0
Oct	62.8	38.0	50.4	94	1963	6	57.6	1971	7	1952	29	44.6	1988	454	2	.0	.1	27.9	@	10.7	.0
Nov	44.8	25.8	35.3	79	1999	8	42.5	1975	-22	1977	26	28.7	1976	890	0	.0	.0	10.7	4.2	22.4	.6
Dec	31.1	13.2	22.2	65+	1982	2	29.6	1982	-34	2000	25	9.4	1983	1328	0	.0	.0	1.2	15.2	29.9	5.9
Ann	58.2	35.1	46.7	106+	Aug 1988	3	76.5	Jul 1999	-47	Feb 1996	3	3.7	Jan 1977	7281	631	.7	16.8	230.1	57.1	163.1	25.5

\+ 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

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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	1.07	1.01	1.55	1960	12	2.65	1982	.15	1981
Feb	1.18	1.08	1.63	1975	24	3.33	1971	.05+	1995
Mar	2.07	1.91	3.23	1998	31	5.48	1998	.06	1994
Apr	3.59	3.46	2.64	2000	20	7.25+	1991	.87	1997
May	3.97	4.00	4.50	1999	17	7.57	1999	.46	1981
Jun	4.51	4.78	3.36	1994	24	11.61	1994	1.08	1977
Jul	4.00	4.00	5.49	1953	26	9.37	1977	1.16	1975
Aug	4.67	3.99	4.36	1981	2	9.44	1981	.46	1971
Sep	3.13	3.14	3.37	1961	30	6.66	1986	.40	1979
Oct	2.40	2.49	2.50	1997	13	5.53	1998	.34	1975
Nov	2.44	2.57	2.41	1961	2	6.30	1991	.23	1976
Dec	1.26	1.07	1.27	1970	11	3.96	2000	.08	1998
Ann	34.29	34.36	5.49	Jul 1953	26	11.61	Jun 1994	.05+	Feb 1995

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	6.3	3.3	.5	@
Feb	5.4	3.4	.6	.2
Mar	6.7	4.8	1.4	.2
Apr	9.7	7.0	2.6	.6
May	10.3	7.6	2.7	.9
Jun	9.6	7.3	3.2	1.3
Jul	9.1	6.6	2.8	1.0
Aug	9.4	6.9	3.3	1.3
Sep	8.2	5.8	2.3	.7
Oct	7.2	5.1	1.7	.3
Nov	8.0	5.2	1.4	.4
Dec	6.2	3.7	.5	.1
Ann	96.1	66.7	23.0	7.0

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	.30	.40	.56	.69	.82	.96	1.11	1.29	1.52	1.88	2.21
Feb	.10	.18	.33	.50	.68	.88	1.12	1.43	1.85	2.56	3.26
Mar	.36	.54	.84	1.12	1.41	1.73	2.09	2.53	3.11	4.05	4.96
Apr	1.30	1.64	2.12	2.53	2.92	3.32	3.75	4.26	4.90	5.89	6.80
May	1.17	1.55	2.11	2.60	3.08	3.57	4.12	4.77	5.60	6.90	8.12
Jun	1.13	1.56	2.21	2.80	3.37	3.98	4.65	5.46	6.51	8.17	9.72
Jul	1.21	1.59	2.16	2.65	3.12	3.62	4.16	4.80	5.62	6.90	8.09
Aug	1.09	1.53	2.21	2.82	3.43	4.08	4.80	5.67	6.80	8.60	10.30
Sep	.73	1.03	1.48	1.89	2.30	2.73	3.21	3.79	4.54	5.74	6.87
Oct	.53	.76	1.11	1.43	1.74	2.08	2.46	2.91	3.51	4.46	5.36
Nov	.53	.75	1.11	1.43	1.76	2.10	2.50	2.96	3.58	4.57	5.50
Dec	.20	.30	.49	.66	.84	1.03	1.26	1.53	1.90	2.50	3.07
Ann	25.33	27.09	29.33	31.02	32.52	33.96	35.44	37.07	39.05	41.90	44.35

\+ 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)

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	9.1	8.9	4	2	12.0	1971	4	20.0	1982	26	1971	14	18	1991	4.6	3.3	1.2	.4	.1	-9.9	-9.9	-9.9	-9.9
Feb	7.4	8.5	3	1	8.0	1975	24	19.0	1975	18	1971	10	14	1971	3.5	2.6	1.0	.3	.0	-9.9	-9.9	-9.9	-9.9
Mar	5.3	5.0	1	0	8.0	1991	13	14.3	1998	12	1993	23	4	1993	2.5	1.8	.8	.2	.0	3.5	1.9	1.4	.0
Apr	1.8	.6	#	0	10.0	1973	9	15.0	1973	15	1973	10	2	1973	1.0	.7	.3	.1	@	.4	.2	.2	.2
May	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.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	.2	.0	#	0	4.0	1997	27	4.0	1997	4	1997	27	#	1997	.1	@	@	.0	.0	.1	.1	.0	.0
Nov	4.3	2.0	#	0	8.0	1991	23	17.5	1991	12+	1991	28	2	1991	2.0	1.5	.7	.1	.0	1.2	.9	.3	.1
Dec	8.6	7.3	2	#	12.0	1985	1	23.5	1985	18	1985	2	18	1985	3.9	3.0	1.0	.4	@	-9.9	-9.9	-9.9	-9.9
Ann	36.7	32.3	N/A	N/A	12.0+	Dec 1985	1	23.5	Dec 1985	26	Jan 1971	14	18+	Jan 1991	17.6	12.9	5.0	1.5	.1	-9.9	-9.9	-9.9	-9.9

+ 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	6/11	6/05	5/31	5/28	5/24	5/21	5/17	5/13	5/07
32	5/25	5/20	5/17	5/15	5/12	5/09	5/07	5/03	4/29
28	5/17	5/12	5/08	5/04	5/01	4/28	4/25	4/21	4/15
24	4/29	4/24	4/21	4/18	4/15	4/13	4/10	4/06	4/02
20	4/20	4/16	4/13	4/11	4/08	4/06	4/04	4/01	3/28
16	4/13	4/08	4/05	4/02	3/30	3/27	3/24	3/21	3/16

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	9/07	9/11	9/13	9/15	9/17	9/19	9/21	9/24	9/27
32	9/13	9/17	9/20	9/23	9/25	9/28	10/01	10/04	10/08
28	9/20	9/25	9/28	10/01	10/04	10/06	10/09	10/12	10/17
24	9/28	10/04	10/08	10/11	10/14	10/17	10/20	10/24	10/30
20	10/09	10/15	10/19	10/23	10/26	10/30	11/02	11/06	11/12
16	10/19	10/24	10/28	10/31	11/03	11/07	11/10	11/14	11/19

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	136	129	124	119	115	111	106	101	94
32	157	150	144	140	136	132	127	122	115
28	176	169	163	159	155	150	146	141	133
24	205	197	191	186	181	176	171	165	157
20	220	213	208	204	200	196	192	187	180
16	238	231	226	222	218	214	209	204	197

***** 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	1504	1179	941	524	233	41	14	34	139	454	890	1328	7281
60	1349	1039	786	384	136	9	1	9	59	310	740	1173	5995
57	1256	955	694	307	92	3	0	2	29	234	650	1080	5302
55	1194	899	634	259	68	1	0	0	17	188	591	1018	4869
50	1039	764	492	159	27	0	0	0	3	98	450	863	3895
32	525	331	120	6	0	0	0	0	0	1	90	371	1444

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	43	76	202	474	833	1069	1237	1179	896	572	189	66	6836
55	0	0	4	38	188	380	524	466	223	46	1	0	1870
57	0	0	1	26	149	322	462	406	175	29	0	0	1570
60	0	0	0	13	101	238	370	320	115	13	0	0	1170
65	0	0	0	3	43	120	228	190	45	2	0	0	631
70	0	0	0	0	14	42	117	97	12	0	0	0	282

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	7	75	273	597	843	1002	938	660	344	70	5	0	7	82	355	952	1795	2797	3735	4395	4739	4809	4814
45	0	1	37	164	444	693	847	783	514	217	30	3	0	1	38	202	646	1339	2186	2969	3483	3700	3730	3733
50	0	1	17	91	303	543	692	628	370	126	12	0	0	1	18	109	412	955	1647	2275	2645	2771	2783	2783
55	0	0	6	45	179	393	537	473	244	60	3	0	0	0	6	51	230	623	1160	1633	1877	1937	1940	1940
60	0	0	1	19	95	253	383	325	141	28	0	0	0	0	1	20	115	368	751	1076	1217	1245	1245	1245
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	2	57	191	384	553	666	622	429	227	47	3	0	2	59	250	634	1187	1853	2475	2904	3131	3178	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