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: KEOKUK LOCK DAM 19, IA **COOP ID: 134381**

Climate Division: IA 9 **NWS Call Sign:** **Elevation: 527 Feet** **Lat: 40˚24N** **Lon: 91˚23W**

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	32.5	15.4	24.0	70	1957	21	35.4	1990	-22	1982	10	10.6	1979	1273	0	.0	.0	2.9	13.6	28.2	4.2
Feb	38.2	20.2	29.2	75	1972	29	39.8	1998	-19	1979	9	16.6+	1979	1003	0	.0	.0	6.0	8.7	23.3	2.3
Mar	49.9	30.4	40.2	87	1986	29	46.0	1973	-11	1960	6	32.3	1978	770	0	.0	.0	15.9	2.1	16.8	.1
Apr	62.4	41.7	52.1	92	1986	25	59.1	1981	15+	1936	3	45.7	1983	398	8	.0	.1	26.1	.1	3.6	.0
May	72.9	52.4	62.7	102	1934	31	69.1	1987	33+	1966	10	57.8	1997	154	80	.0	.5	30.9	.0	.0	.0
Jun	82.4	62.1	72.3	104+	1934	29	76.8	1971	44+	1993	5	67.4	1982	11	229	.1	5.9	30.0	.0	.0	.0
Jul	87.1	67.1	77.1	113	1936	15	81.9	1983	50+	1967	14	73.4	1992	0	376	1.0	12.0	31.0	.0	.0	.0
Aug	84.9	65.0	75.0	110	1934	9	82.6	1983	44	1986	28	68.8	1992	10	317	.8	8.7	31.0	.0	.0	.0
Sep	77.4	56.1	66.8	100+	1936	11	72.1	1998	32+	1984	29	61.0	1993	64	116	@	2.8	30.0	.0	.1	.0
Oct	66.3	44.6	55.5	94+	1939	7	62.2	1971	20	1972	19	49.8	1976	310	12	.0	.1	29.3	.0	2.2	.0
Nov	50.2	32.5	41.4	82	1950	1	49.9	1999	-3	1964	30	34.8	1996	710	0	.0	.0	15.4	1.5	14.1	.0
Dec	37.1	20.9	29.0	70	1970	3	36.2	1982	-20	1989	24	15.5	1983	1117	0	.0	.0	4.3	8.5	26.2	2.3
Ann	61.8	42.4	52.1	113	Jul 1936	15	82.6	Aug 1983	-22	Jan 1982	10	10.6	Jan 1979	5820	1138	1.9	30.1	252.8	34.5	114.5	8.9

+ 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: 1933-2001

(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	1.29	1.00	3.45	1965	2	3.29	1999	.05	1986
Feb	1.42	1.16	3.20	1997	21	5.01	1997	.26	1996
Mar	2.65	2.47	4.68	1985	4	7.38	1985	.44	1986
Apr	3.51	3.28	3.51	1964	20	7.47	1973	.68	1985
May	5.38	5.02	4.61	1973	27	14.27	1995	1.05	1987
Jun	3.92	3.02	4.70	1968	25	11.16	1990	.68	1991
Jul	3.99	3.79	3.16	1960	13	12.62	1993	.62	1975
Aug	3.20	2.51	5.38	2001	23	8.93	1977	.31	1992
Sep	3.94	3.47	4.82	1961	14	10.55	1986	.00	1979
Oct	3.04	2.30	4.20	1986	3	8.06	1998	.32	1987
Nov	2.98	2.66	2.35	1984	1	8.23	1985	.27	1989
Dec	1.99	1.97	1.67	1994	7	5.71	1982	.12	1976
Ann	37.31	36.28	5.38	Aug 2001	23	14.27	May 1995	.00	Sep 1979

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	7.5	3.4	.6	.2
Feb	6.4	3.3	.7	.2
Mar	9.1	5.5	1.7	.5
Apr	10.5	7.0	2.1	.7
May	12.1	8.4	3.3	1.4
Jun	9.6	6.6	2.5	1.3
Jul	9.2	6.5	2.9	1.1
Aug	8.6	5.9	2.2	1.0
Sep	7.7	5.7	2.9	1.2
Oct	7.7	5.1	1.8	.7
Nov	9.0	5.8	2.3	.6
Dec	7.8	4.6	1.2	.5
Ann	105.2	67.8	24.2	9.4

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	.15	.24	.42	.60	.80	1.01	1.26	1.58	2.00	2.70	3.39
Feb	.29	.42	.63	.82	1.01	1.21	1.45	1.72	2.09	2.68	3.23
Mar	.52	.76	1.15	1.50	1.87	2.26	2.70	3.23	3.94	5.07	6.14
Apr	1.04	1.37	1.87	2.30	2.72	3.16	3.64	4.21	4.94	6.08	7.15
May	1.35	1.86	2.64	3.33	4.02	4.74	5.54	6.50	7.75	9.73	11.58
Jun	.84	1.20	1.77	2.29	2.82	3.38	4.01	4.76	5.76	7.35	8.85
Jul	.61	.95	1.53	2.08	2.65	3.27	3.99	4.87	6.05	7.97	9.81
Aug	.79	1.09	1.56	1.97	2.38	2.82	3.30	3.88	4.63	5.82	6.93
Sep	.84	1.40	2.05	2.58	3.08	3.59	4.15	4.81	5.65	6.97	8.19
Oct	.52	.79	1.24	1.65	2.08	2.54	3.07	3.71	4.57	5.95	7.27
Nov	.47	.72	1.16	1.57	1.99	2.46	2.99	3.64	4.51	5.93	7.28
Dec	.31	.49	.77	1.05	1.33	1.64	2.00	2.43	3.01	3.96	4.86
Ann	22.54	25.22	28.75	31.50	33.98	36.42	38.97	41.83	45.34	50.53	55.10

\+ 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: 1933-2001
(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	6.7	5.0	3	2	10.0	1999	2	25.0	1979	23	1979	16	15	1979	3.4	2.9	.9	.2	@	12.4	7.8	4.8	1.2
Feb	4.5	2.0	2	1	8.0	1975	24	16.2	1975	19	1979	12	15	1979	2.3	1.8	.7	.2	.0	11.1	7.2	3.8	1.4
Mar	2.5	.0	#	#	7.0	1978	3	15.0	1978	14	1978	4	4	1978	.9	.9	.4	.2	.0	2.9	1.7	.7	.2
Apr	.9	.0	#	0	5.0	1997	11	6.0	1982	5	1997	11	1	1997	.3	.3	.2	@	.0	.5	.2	@	.0
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	.0	.0	#	0	.4	1997	27	.4	1997	#	1997	27	#	1997	@	.0	.0	.0	.0	.0	.0	.0	.0
Nov	1.5	.0	#	0	7.0	1975	27	10.0	1975	7	1975	27	1	1975	.7	.6	.1	.1	.0	.9	.2	.1	.0
Dec	4.6	3.3	1	#	6.0	1984	30	11.0+	1978	10	1983	29	7	2000	2.2	1.9	.5	.1	.0	6.2	3.0	1.5	.1
Ann	20.7	10.3	N/A	N/A	10.0	Jan 1999	2	25.0	Jan 1979	23	Jan 1979	16	15+	Feb 1979	9.8	8.4	2.8	.8	@	34.0	20.1	10.9	2.9

+ 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	5/03	4/29	4/26	4/23	4/21	4/18	4/16	4/13	4/08
32	4/17	4/14	4/12	4/10	4/08	4/06	4/05	4/02	3/30
28	4/12	4/08	4/06	4/03	4/01	3/30	3/27	3/24	3/21
24	4/07	4/01	3/28	3/25	3/22	3/18	3/15	3/11	3/05
20	3/30	3/23	3/18	3/14	3/10	3/06	3/02	2/25	2/19
16	3/26	3/17	3/11	3/06	3/01	2/24	2/18	2/12	2/03

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	9/25	9/30	10/04	10/07	10/10	10/13	10/16	10/20	10/25
32	10/07	10/13	10/17	10/20	10/24	10/27	10/30	11/03	11/09
28	10/23	10/28	10/31	11/03	11/06	11/08	11/11	11/15	11/19
24	10/30	11/04	11/08	11/11	11/13	11/16	11/19	11/23	11/27
20	11/04	11/11	11/15	11/19	11/23	11/27	12/01	12/05	12/12
16	11/15	11/21	11/25	11/29	12/02	12/06	12/09	12/14	12/20

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	192	185	180	175	171	167	163	158	151
32	214	208	204	201	198	194	191	187	181
28	233	228	224	221	218	215	212	208	203
24	258	251	245	241	236	232	227	221	214
20	286	276	269	263	257	251	245	238	229
16	308	297	289	282	276	270	263	255	244

***** 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	1273	1003	770	398	154	11	0	10	64	310	710	1117	5820
60	1118	863	616	267	79	2	0	1	19	187	562	962	4676
57	1025	783	531	200	47	0	0	0	7	128	476	869	4066
55	963	731	473	161	32	0	0	0	3	96	422	808	3689
50	814	601	338	83	10	0	0	0	0	41	294	664	2845
32	341	225	53	0	0	0	0	0	0	0	36	231	886

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	91	146	306	601	949	1208	1399	1331	1042	726	316	137	8252
55	0	8	13	72	268	518	686	618	355	109	12	1	2660
57	0	4	9	51	221	458	624	556	299	79	6	0	2307
60	0	0	1	28	159	369	531	463	221	45	2	0	1819
65	0	0	0	8	80	229	376	317	116	12	0	0	1138
70	0	0	0	1	30	113	229	188	47	2	0	0	610

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	10	44	165	414	737	995	1169	1103	828	510	163	23	10	54	219	633	1370	2365	3534	4637	5465	5975	6138	6161
45	3	19	93	282	583	845	1014	948	678	360	88	4	3	22	115	397	980	1825	2839	3787	4465	4825	4913	4917
50	0	5	47	177	430	695	859	793	528	234	41	1	0	5	52	229	659	1354	2213	3006	3534	3768	3809	3810
55	0	0	22	94	289	545	704	638	385	134	17	0	0	0	22	116	405	950	1654	2292	2677	2811	2828	2828
60	0	0	5	45	165	397	549	484	253	61	3	0	0	0	5	50	215	612	1161	1645	1898	1959	1962	1962
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	5	33	98	239	450	670	808	755	530	297	90	15	5	38	136	375	825	1495	2303	3058	3588	3885	3975	3990

(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