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: LE MARS, IA **COOP ID: 134735**

Climate Division: IA 1 **NWS Call Sign:** **Elevation: 1,195 Feet** **Lat: 42˚47N** **Lon: 96˚09W**

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	26.2	6.0	16.1	67+	1944	25	27.4	1992	-37	1912	12	3.5	1979	1517	0	.0	.0	.9	19.4	30.6	10.3
Feb	32.8	12.1	22.5	70	1981	17	33.2	1987	-35+	1899	9	8.3	1979	1192	0	.0	.0	3.8	12.9	26.7	5.4
Mar	45.6	23.3	34.5	87	1968	30	41.8	2000	-26	1960	5	26.0	1975	948	0	.0	.0	12.8	4.5	23.5	1.3
Apr	60.6	34.5	47.6	96	1980	21	55.5	1981	-2	1975	3	41.3	1983	528	4	.0	.3	24.5	.4	11.1	@
May	72.9	47.5	60.2	108	1934	30	67.5	1977	17	1907	1	53.5	1997	205	55	.0	1.4	30.6	.0	1.1	.0
Jun	82.4	57.5	70.0	106	1933	10	75.0	1988	33	1969	3	65.9	1982	24	172	.4	6.9	30.0	.0	.0	.0
Jul	86.0	61.7	73.9	111	1936	17	78.9	1974	38	1972	5	67.1	1992	9	281	.9	10.5	31.0	.0	.0	.0
Aug	83.4	58.9	71.2	108+	1930	3	79.1	1983	35+	1915	30	66.1	1992	28	218	.2	7.1	31.0	.0	.0	.0
Sep	76.0	48.6	62.3	103	1976	6	68.6	1998	22+	1913	22	56.6	1993	143	63	@	2.6	29.7	.0	1.1	.0
Oct	63.4	36.1	49.8	95	1963	5	54.3	1973	-7	1925	30	43.7	1976	475	2	.0	.1	27.5	.1	8.8	.0
Nov	43.3	22.4	32.9	80	1999	9	44.0	1999	-24	1959	14	22.4	1985	965	0	.0	.0	10.2	5.9	23.9	.7
Dec	30.0	10.7	20.4	68+	1921	12	29.1	1979	-33	1917	29	3.3	1983	1385	0	.0	.0	1.9	15.7	30.3	5.9
Ann	58.6	34.9	46.8	111	Jul 1936	17	79.1	Aug 1983	-37	Jan 1912	12	3.3	Dec 1983	7419	795	1.5	28.9	233.9	58.9	157.1	23.6

\+ 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: 1896-2001

(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	.64	.51	1.40	1982	22	2.31	1982	.02	1991
Feb	.54	.44	1.63	1951	28	2.06	1971	.01	1996
Mar	1.95	1.75	3.66	1969	20	4.83	1998	.00	1994
Apr	2.74	2.78	2.56	1985	22	7.52	1985	.38	1987
May	3.44	3.38	2.41	1930	7	5.79	1972	.51	1989
Jun	3.97	3.56	5.20	1996	21	9.48	1983	.74	1987
Jul	3.31	2.52	5.39	1900	15	9.94	1978	.51	1985
Aug	3.40	2.88	8.76	1985	29	12.47	1985	.43	1983
Sep	2.52	2.67	5.50	1900	11	6.09	1986	.71	1998
Oct	1.92	1.37	3.13	1979	30	5.12	1984	.00	1989
Nov	1.37	1.16	2.20	1905	23	4.47	1983	.02+	1980
Dec	.72	.65	2.15	1902	20	2.67	1982	.00	1989
Ann	26.52	26.88	8.76	Aug 1985	29	12.47	Aug 1985	.00+	Mar 1994

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	5.0	2.1	.2	@
Feb	4.6	1.8	.1	@
Mar	6.6	4.3	1.3	.2
Apr	8.8	5.8	1.7	.5
May	10.2	6.7	2.7	.7
Jun	9.2	6.8	2.4	.9
Jul	7.8	5.1	2.1	.8
Aug	7.8	5.1	2.0	1.0
Sep	7.0	4.5	1.6	.7
Oct	6.0	4.0	1.3	.4
Nov	5.7	3.2	.8	.3
Dec	5.2	2.1	.3	@
Ann	83.9	51.5	16.5	5.5

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	.07	.12	.20	.29	.39	.50	.62	.78	.99	1.35	1.69
Feb	.04	.08	.15	.23	.31	.40	.52	.66	.86	1.19	1.52
Mar	.20	.42	.75	1.03	1.32	1.63	1.98	2.41	2.98	3.89	4.76
Apr	.55	.79	1.20	1.56	1.94	2.33	2.79	3.33	4.05	5.20	6.29
May	1.36	1.68	2.13	2.51	2.86	3.22	3.60	4.05	4.62	5.49	6.28
Jun	1.03	1.41	1.98	2.49	2.99	3.51	4.10	4.79	5.69	7.12	8.45
Jul	.67	.97	1.46	1.90	2.35	2.83	3.37	4.02	4.88	6.26	7.56
Aug	.52	.81	1.30	1.77	2.26	2.79	3.40	4.15	5.15	6.79	8.36
Sep	.75	.99	1.34	1.65	1.96	2.27	2.62	3.02	3.55	4.37	5.14
Oct	.12	.32	.62	.90	1.20	1.52	1.90	2.37	3.00	4.02	5.02
Nov	.08	.16	.33	.52	.73	.98	1.28	1.66	2.20	3.11	4.02
Dec	.03	.09	.19	.30	.41	.54	.70	.89	1.15	1.60	2.03
Ann	16.85	18.64	20.98	22.78	24.40	25.98	27.63	29.48	31.73	35.05	37.94

\+ 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: 1896-2001
(3) Derived from 1971-2000 serially complete daily data

Complete documentation available from:
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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	7.4	4.3	3	2
Feb	4.7	4.3	4	1
Mar	6.0	4.9	2	#
Apr	2.0	.2	#	0
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	.5	.0	#	0
Nov	5.0	5.3	#	#
Dec	6.8	7.7	2	1
Ann	32.4	26.7	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	15.2	1982	22	27.2	1982	26	1982	25	11	1983
Feb	11.0	1984	18	13.1	1978	23	1979	10	20	1979
Mar	13.0	1977	2	17.6	1983	21	1979	10	12	1979
Apr	4.5	1983	14	11.4	1983	6+	1985	1	1	1975
May	.0	0	0	.0	0	#	1971	23	#	1971
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	2.9	1981	24	4.7	1982	3	1982	20	#+	1999
Nov	9.8	1983	27	20.3	1983	17	1983	29	2	1985
Dec	8.2	1982	28	17.4	1982	23	1983	28	18	1983
Ann	15.2	Jan 1982	22	27.2	Jan 1982	26	Jan 1982	25	20	Feb 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	4.1	2.2	.5	.2	@
Feb	3.4	1.6	.4	.1	@
Mar	2.6	1.6	.6	.2	.1
Apr	.9	.6	.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	.2	.0	.0	.0
Nov	2.4	1.3	.3	.2	.0
Dec	3.7	2.1	.7	.2	.0
Ann	17.4	9.6	2.7	.9	.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	19.8	14.9	10.2	4.6
Feb	14.1	9.8	7.7	6.1
Mar	8.1	5.7	4.3	1.6
Apr	.9	.4	.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	.3	@	.0	.0
Nov	4.1	1.5	.5	.2
Dec	13.4	7.1	3.8	1.8
Ann	60.7	39.4	26.6	14.3

+ 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	5/23	5/18	5/14	5/11	5/08	5/04	5/01	4/27	4/22
32	5/13	5/08	5/05	5/02	4/29	4/26	4/23	4/20	4/15
28	5/06	5/01	4/27	4/23	4/20	4/17	4/14	4/10	4/04
24	4/19	4/15	4/12	4/09	4/07	4/04	4/02	3/30	3/25
20	4/14	4/09	4/05	4/02	3/30	3/27	3/23	3/20	3/14
16	4/08	4/02	3/29	3/26	3/23	3/20	3/16	3/12	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	9/28	10/01	10/05
32	9/18	9/23	9/26	9/29	10/02	10/04	10/07	10/11	10/15
28	9/24	9/30	10/04	10/07	10/10	10/13	10/17	10/21	10/26
24	10/09	10/14	10/17	10/20	10/23	10/26	10/29	11/01	11/06
20	10/17	10/22	10/26	10/29	11/01	11/04	11/07	11/11	11/16
16	10/27	11/02	11/06	11/10	11/13	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	159	152	147	142	138	133	129	124	116
32	171	166	162	158	155	152	148	144	139
28	193	186	181	176	172	168	164	159	151
24	217	210	206	202	199	195	191	187	181
20	239	231	225	220	215	211	206	200	192
16	259	251	245	240	235	230	225	219	211

***** 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	1517	1192	948	528	205	24	9	28	143	475	965	1385	7419
60	1362	1052	793	389	115	4	0	7	66	329	815	1230	6162
57	1269	968	700	313	76	1	0	2	36	251	725	1137	5478
55	1207	912	639	266	56	0	0	0	22	204	667	1075	5048
50	1053	783	495	166	21	0	0	0	5	110	527	921	4081
32	543	358	114	7	0	0	0	0	0	2	145	427	1596

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	48	90	189	473	874	1139	1296	1213	910	552	170	65	7019
55	0	0	1	42	216	449	583	501	242	41	2	0	2077
57	0	0	0	29	175	390	521	440	196	26	0	0	1777
60	0	0	0	15	121	303	428	352	136	11	0	0	1366
65	0	0	0	4	55	172	281	218	63	2	0	0	795
70	0	0	0	0	19	76	154	115	22	0	0	0	386

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	1	11	90	309	664	938	1086	1020	722	374	70	2	1	12	102	411	1075	2013	3099	4119	4841	5215	5285	5287
45	0	0	42	195	511	788	931	865	572	248	28	1	0	0	42	237	748	1536	2467	3332	3904	4152	4180	4181
50	0	0	13	114	365	638	776	710	430	145	10	0	0	0	13	127	492	1130	1906	2616	3046	3191	3201	3201
55	0	0	3	59	240	489	621	555	298	71	1	0	0	0	3	62	302	791	1412	1967	2265	2336	2337	2337
60	0	0	1	28	133	348	467	401	186	25	0	0	0	0	1	29	162	510	977	1378	1564	1589	1589	1589
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	0	14	65	206	416	616	735	678	466	243	50	1	0	14	79	285	701	1317	2052	2730	3196	3439	3489	3490

(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