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: LUVERNE, MN **COOP ID: 214937**

Climate Division: MN 7 **NWS Call Sign:** **Elevation: 1,500 Feet** **Lat: 43˚40N** **Lon: 96˚12W**

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	22.7	2.0	12.4	65	1981	24	25.4	1990	-37	1970	19	-.1	1979	1633	0	.0	.0	.6	21.5	30.9	12.5
Feb	29.7	8.3	19.0	66+	1981	17	32.3	1998	-36	1962	28	5.0	1979	1288	0	.0	.0	2.1	14.5	27.6	7.1
Mar	41.9	20.3	31.1	85	1978	30	39.5	2000	-23+	1962	1	22.1	1984	1051	0	.0	.0	10.0	5.6	25.7	1.3
Apr	57.5	32.1	44.8	94	1980	21	53.0	1977	6	1982	6	37.1	1995	610	3	.0	.2	23.3	.5	12.8	.0
May	70.6	45.9	58.3	100	1967	25	65.2	1977	9	1967	3	51.5	1995	249	40	.0	.7	30.6	.0	1.8	.0
Jun	79.9	55.9	67.9	104+	1988	22	74.3	1988	33	1969	13	63.1	1982	47	133	.3	4.0	30.0	.0	.0	.0
Jul	83.8	60.5	72.2	106	1976	9	77.3	1974	39	1967	4	64.1	1992	21	242	.5	8.1	31.0	.0	.0	.0
Aug	81.6	58.0	69.8	103	1973	26	77.2	1983	34	1964	13	64.4	1992	36	185	.2	4.5	31.0	.0	.0	.0
Sep	73.3	46.9	60.1	104	1976	6	66.4	1978	20	1991	19	54.3	1984	188	41	.1	1.6	29.8	.0	1.7	.0
Oct	60.5	33.7	47.1	91+	1997	2	52.5	1973	9+	1993	31	41.8	1987	555	0	.0	@	26.2	.1	11.5	.0
Nov	40.4	20.5	30.5	78	1999	13	40.8	1999	-16	1993	26	19.8	1985	1037	0	.0	.0	7.8	7.7	25.8	1.0
Dec	26.7	7.3	17.0	66	1998	2	26.5	1979	-28	1990	23	.1	1983	1488	0	.0	.0	1.0	19.1	30.7	8.2
Ann	55.7	32.6	44.2	106	Jul 1976	9	77.3	Jul 1974	-37	Jan 1970	19	-.1	Jan 1979	8203	644	1.1	19.1	223.4	69.0	168.5	30.1

\+ 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: 1950-2000

(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	.62	.51	.82	1983	10	2.11	1994	.00	1981
Feb	.67	.62	1.27	1951	28	1.51	1984	.00	1989
Mar	2.09	1.85	1.84	1995	25	5.50	1977	.14	1994
Apr	2.63	2.25	3.17	1967	2	5.73	1984	.38	1996
May	3.32	3.10	3.20	1951	9	7.97	1972	.83	1998
Jun	4.15	3.97	3.80	1994	13	9.13	1993	.79	1976
Jul	3.58	3.16	4.31	1992	2	10.49	1993	.63	1988
Aug	3.33	3.13	3.35	1980	13	7.35+	1980	.49	1971
Sep	2.57	2.16	2.82	1986	17	8.80	1986	.16	1998
Oct	2.19	1.84	4.12	1979	31	6.30	1998	.00	1988
Nov	1.76	1.45	2.00	1998	10	5.25	1996	.00	1984
Dec	.79	.57	1.15	1971	2	2.91	1982	.00	1979
Ann	27.70	27.34	4.31	Jul 1992	2	10.49	Jul 1993	.00+	Feb 1989

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	5.3	2.2	.1	.0
Feb	4.3	2.2	.3	@
Mar	7.2	4.7	1.4	.4
Apr	8.9	6.0	1.6	.5
May	10.9	7.2	2.1	.5
Jun	10.0	6.8	2.9	1.2
Jul	8.1	5.8	2.4	.9
Aug	8.3	5.5	2.4	.7
Sep	7.5	5.0	1.8	.6
Oct	6.2	4.0	1.4	.6
Nov	6.0	3.6	1.3	.4
Dec	4.8	2.1	.4	.1
Ann	87.5	55.1	18.1	5.9

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	.02	.06	.15	.24	.34	.45	.58	.75	.99	1.39	1.78
Feb	.11	.20	.31	.41	.50	.59	.70	.82	.99	1.25	1.49
Mar	.34	.53	.83	1.12	1.41	1.73	2.10	2.55	3.15	4.12	5.05
Apr	.63	.87	1.26	1.60	1.94	2.30	2.70	3.18	3.81	4.81	5.75
May	.99	1.30	1.77	2.18	2.58	2.99	3.45	3.98	4.68	5.76	6.77
Jun	1.13	1.52	2.12	2.65	3.16	3.70	4.30	5.01	5.93	7.37	8.72
Jul	.68	1.01	1.53	2.02	2.51	3.04	3.64	4.36	5.32	6.87	8.33
Aug	.82	1.13	1.62	2.05	2.48	2.93	3.43	4.03	4.81	6.05	7.21
Sep	.39	.61	.98	1.33	1.70	2.11	2.57	3.14	3.90	5.14	6.33
Oct	.10	.30	.62	.94	1.29	1.67	2.13	2.69	3.46	4.74	5.99
Nov	.05	.18	.42	.67	.95	1.27	1.66	2.15	2.83	3.97	5.10
Dec	.02	.08	.19	.30	.42	.57	.74	.96	1.27	1.78	2.29
Ann	16.27	18.32	21.03	23.15	25.08	26.97	28.95	31.18	33.93	37.99	41.58

\+ 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: 1950-2000
(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	8.1	6.4	7	7
Feb	5.5	5.3	7	4
Mar	8.6	7.2	3	2
Apr	2.4	.5	#	0
May	.0	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	#	.0	#	0
Oct	.8	.0	#	0
Nov	6.9	7.0	2	1
Dec	7.2	5.3	5	3
Ann	39.5	31.7	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	8.0	1983	10	30.6	1979	35	1979	31	17	1982
Feb	11.0	1984	19	11.0	1984	36	1979	2	30	1979
Mar	10.0	1984	5	30.0	1983	33	1979	11	17	1979
Apr	7.0	1984	30	11.0	2000	14	1975	3	2	1975
May	1.0	1976	2	1.0	1976	1	1976	2	#	1976
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	#	1995	22	#	1995	#	1995	22	#	1995
Oct	7.0	1982	20	7.0	1982	7	1982	20	1	1982
Nov	11.0	1994	28	18.0	1983	15	1975	30	7+	1993
Dec	12.0	1996	15	19.6	1985	31	1985	20	24	1985
Ann	12.0	Dec 1996	15	30.6	Jan 1979	36	Feb 1979	2	30	Feb 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	4.5	3.4	1.1	.5	.0
Feb	3.0	2.2	.8	.2	.1
Mar	3.1	2.7	1.2	.6	@
Apr	.8	.8	.3	.1	.0
May	@	@	.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	.3	.1	@	.0
Nov	2.8	2.6	.9	.5	@
Dec	3.5	2.8	.9	.3	@
Ann	18.0	14.8	5.3	2.2	.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	25.4	20.9	17.8	9.0
Feb	20.8	16.7	13.3	6.9
Mar	10.6	7.8	5.5	2.1
Apr	1.4	.7	.4	.1
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	.3	.1	.1	.0
Nov	7.3	4.7	3.0	1.3
Dec	18.5	12.4	8.7	3.8
Ann	84.3	63.3	48.8	23.2

+ 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	5/29	5/24	5/20	5/17	5/14	5/11	5/07	5/04	4/28
32	5/19	5/14	5/10	5/07	5/04	5/01	4/28	4/24	4/19
28	5/10	5/05	5/01	4/28	4/26	4/23	4/20	4/16	4/11
24	4/25	4/20	4/17	4/14	4/12	4/09	4/06	4/03	3/29
20	4/17	4/12	4/09	4/06	4/03	3/31	3/28	3/24	3/19
16	4/12	4/07	4/03	3/30	3/27	3/24	3/20	3/16	3/11

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	9/09	9/12	9/15	9/17	9/19	9/21	9/24	9/26	9/30
32	9/15	9/18	9/21	9/24	9/26	9/28	9/30	10/03	10/07
28	9/20	9/26	9/29	10/03	10/06	10/09	10/12	10/16	10/21
24	9/27	10/03	10/07	10/11	10/15	10/18	10/22	10/27	11/02
20	10/09	10/14	10/18	10/22	10/25	10/28	11/01	11/05	11/10
16	10/16	10/22	10/26	10/30	11/02	11/05	11/09	11/13	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	151	143	137	133	128	123	118	113	105
32	164	157	152	148	144	140	136	131	125
28	184	177	171	167	162	158	153	148	140
24	207	200	194	190	186	181	177	171	164
20	226	218	213	209	205	200	196	191	183
16	244	236	230	224	219	215	209	203	195

***** 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	1633	1288	1051	610	249	47	21	36	188	555	1037	1488	8203
60	1478	1148	896	467	149	13	6	10	96	403	887	1333	6886
57	1385	1064	803	387	103	4	0	3	57	316	797	1240	6159
55	1323	1008	741	336	78	2	0	1	38	263	737	1178	5705
50	1168	875	593	224	34	0	0	0	10	149	593	1023	4669
32	647	432	168	17	0	0	0	0	0	4	181	508	1957

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	37	68	140	400	814	1076	1244	1171	843	473	134	43	6443
55	0	0	0	29	179	388	531	460	191	18	0	0	1796
57	0	0	0	20	142	330	469	399	150	9	0	0	1519
60	0	0	0	10	95	249	382	313	99	3	0	0	1151
65	0	0	0	3	40	133	242	185	41	0	0	0	644
70	0	0	0	0	13	55	135	92	12	0	0	0	307

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	3	57	254	610	870	1022	951	654	307	44	1	0	3	60	314	924	1794	2816	3767	4421	4728	4772	4773
45	0	1	24	150	456	720	867	796	509	191	15	0	0	1	25	175	631	1351	2218	3014	3523	3714	3729	3729
50	0	0	7	80	313	571	712	641	365	101	3	0	0	0	7	87	400	971	1683	2324	2689	2790	2793	2793
55	0	0	1	39	192	422	557	486	238	45	0	0	0	0	1	40	232	654	1211	1697	1935	1980	1980	1980
60	0	0	0	13	102	281	403	335	135	15	0	0	0	0	0	13	115	396	799	1134	1269	1284	1284	1284
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	0	5	47	176	382	566	678	631	419	206	30	0	0	5	52	228	610	1176	1854	2485	2904	3110	3140	3140

(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