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: DULUTH HARBOR STA, MN **COOP ID: 212246**

Climate Division: MN 3 **NWS Call Sign:** **Elevation: 610 Feet** **Lat: 46˚46N** **Lon: 92˚05W**

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	19.6	1.1	10.4	48	1973	25	20.8	1990	-32+	1994	18	-.5	1994	1693	0	.0	.0	.0	26.9	30.9	14.0
Feb	25.8	7.4	16.6	54+	1991	9	30.8	1998	-37	1996	3	3.1	1979	1356	0	.0	.0	.2	20.2	27.8	7.9
Mar	34.5	18.3	26.4	68	2000	8	34.5	2000	-28	1962	1	17.9	1996	1197	0	.0	.0	1.3	13.1	28.3	1.9
Apr	46.5	30.5	38.5	81	1965	29	45.0	1987	-14+	1975	3	33.0	1975	794	0	.0	.0	8.2	1.6	14.8	.1
May	57.4	39.3	48.4	90	1986	30	53.3	1988	21	1967	3	42.8	1996	516	0	.0	@	20.9	.0	1.4	.0
Jun	67.6	48.1	57.9	91+	1963	30	63.8	1987	30	1995	8	53.9	1972	231	16	.0	.1	29.0	.0	.1	.0
Jul	74.9	56.7	65.8	97	1980	10	70.4	1988	41	1996	10	60.7	1992	72	96	.0	.5	31.0	.0	.3	.0
Aug	73.0	57.5	65.3	97	2001	8	71.5	1983	40	1985	14	60.2	1977	88	97	.0	.4	31.0	.0	.0	.0
Sep	64.5	48.2	56.4	92	1976	7	62.9	1998	29+	1976	25	51.1	1974	274	15	.0	@	29.0	.0	.4	.0
Oct	52.6	37.8	45.2	85	1992	2	49.2	1973	14	1976	27	40.2	1976	614	0	.0	.0	19.1	.2	4.2	.0
Nov	37.2	23.7	30.5	67+	2001	7	38.8	1999	-10+	1985	29	22.9	1995	1036	0	.0	.0	2.8	9.4	21.5	.6
Dec	24.5	8.8	16.7	57	1962	3	27.8	1997	-27	1983	19	5.0	1983	1500	0	.0	.0	.1	22.9	30.1	7.8
Ann	48.2	31.5	39.8	97+	Aug 2001	8	71.5	Aug 1983	-37	Feb 1996	3	-.5	Jan 1994	9371	224	.0	1.0	172.6	94.3	159.8	32.3

\+ 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: 1933-2001

(3) Derived from 1971-2000 serially complete daily data

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: DULUTH HARBOR STA, MN

COOP ID: 212246

Climate Division: MN 3 **NWS Call Sign:** **Elevation: 610 Feet** **Lat: 46˚46N** **Lon: 92˚05W**

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	.95	.69	1.35	1975	10	2.72	1975	.15	1991
Feb	.53	.49	.94	1977	25	1.65	1971	.00	1996
Mar	1.37	1.33	1.74	1977	28	5.08	1977	.05	1993
Apr	1.58	1.47	1.96	1968	23	4.93	1981	.00	1997
May	2.26	1.99	2.06	1989	24	5.06	1985	.17	1976
Jun	3.71	3.72	2.50	1986	10	8.40	1979	.00	1995
Jul	3.73	3.55	2.08+	1970	18	9.15	1978	.76	1989
Aug	3.69	3.76	2.73	1990	25	8.42	1978	.35	1991
Sep	3.71	3.31	4.35	1964	7	8.13	1990	.60	1974
Oct	1.89	1.28	2.50	1982	6	5.87	1971	.00	1989
Nov	1.39	1.23	1.65	1978	9	4.04	1983	.00+	1994
Dec	.79	.66	1.47	1983	11	2.87	1983	.00+	1994
Ann	25.60	24.94	4.35	Sep 1964	7	9.15	Jul 1978	.00+	Apr 1997

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	9.8	3.1	.6	@
Feb	8.8	2.3	.3	.0
Mar	10.4	3.9	.9	.1
Apr	8.8	4.0	.8	.1
May	10.9	5.1	1.5	.4
Jun	10.6	5.7	2.3	.8
Jul	11.6	5.2	2.1	.7
Aug	11.4	5.5	1.8	.9
Sep	11.8	5.5	2.2	.7
Oct	9.8	3.9	1.2	.3
Nov	9.3	3.8	.9	.1
Dec	10.4	2.9	.5	.1
Ann	123.6	50.9	15.1	4.2

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	.16	.24	.38	.51	.64	.79	.96	1.16	1.43	1.88	2.30
Feb	.08	.15	.24	.31	.39	.46	.55	.65	.78	.99	1.19
Mar	.21	.33	.53	.72	.91	1.13	1.37	1.68	2.08	2.73	3.36
Apr	.16	.35	.61	.84	1.07	1.32	1.61	1.95	2.41	3.15	3.85
May	.43	.64	.97	1.27	1.58	1.92	2.30	2.76	3.37	4.34	5.27
Jun	.85	1.38	1.99	2.48	2.94	3.41	3.92	4.52	5.29	6.47	7.57
Jul	1.05	1.41	1.94	2.41	2.86	3.34	3.86	4.49	5.29	6.56	7.73
Aug	.91	1.25	1.79	2.27	2.74	3.25	3.80	4.47	5.34	6.71	8.00
Sep	1.01	1.36	1.89	2.36	2.82	3.31	3.84	4.47	5.30	6.59	7.80
Oct	.16	.36	.67	.95	1.23	1.54	1.90	2.33	2.91	3.85	4.75
Nov	.00	.17	.42	.65	.87	1.12	1.40	1.74	2.20	2.95	3.67
Dec	.00	.00	.32	.45	.57	.70	.84	1.00	1.20	1.53	1.83
Ann	17.14	18.74	20.81	22.40	23.82	25.19	26.62	28.21	30.15	32.98	35.45

\+ 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

Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data,
and Information Services

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: DULUTH HARBOR STA, MN **COOP ID: 212246**

Climate Division: MN 3 **NWS Call Sign:** **Elevation: 610 Feet** **Lat: 46°46N** **Lon: 92°05W**

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	9.0	8.1	9	8	10.5	1989	7	19.2	1982	36	1984	2	27	1984	6.6	3.0	1.1	.3	.1	-9.9	-9.9	-9.9	-9.9
Feb	5.9	4.3	9	6	5.0	1972	17	14.3	1972	34	1982	14	25	1982	5.6	2.1	.3	.1	.0	-9.9	-9.9	-9.9	-9.9
Mar	8.2	7.3	7	5	16.0	1985	4	25.5	1985	25	1979	16	19	1979	4.8	2.1	.8	.2	.1	20.0	16.8	12.0	5.9
Apr	1.1	.0	1	#	5.0	1983	14	9.1	1972	10	1989	1	3	1983	.9	.4	.2	@	.0	2.3	1.1	.7	.0
May	.0	.0	0	0	.1	1976	2	.1	1976	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	#	1974	30	#	1974	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Oct	.1	.0	#	0	2.0	1984	30	2.0	1984	1+	1992	15	#+	1992	@	@	.0	.0	.0	.1	.0	.0	.0
Nov	4.3	1.6	1	#	12.0	1983	23	22.5	1983	28	1991	2	6	1983	2.1	1.0	.4	.2	.1	3.5	1.9	.9	.5
Dec	10.6	10.6	5	3	12.0	1982	28	20.7	1983	38	1983	31	31	1983	6.1	2.7	.8	.4	.1	20.4	15.1	9.9	3.6
Ann	39.2	31.9	N/A	N/A	16.0	Mar 1985	4	25.5	Mar 1985	38	Dec 1983	31	31	Dec 1983	26.1	11.3	3.6	1.2	.4	-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

Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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: DULUTH HARBOR STA, MN **COOP ID: 212246**

Climate Division: MN 3 **NWS Call Sign:** **Elevation: 610 Feet** **Lat: 46˚46N** **Lon: 92˚05W**

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	7/07	6/24	6/14	6/06	5/30	5/22	5/14	5/04	4/21
32	6/23	6/10	5/31	5/22	5/15	5/07	4/28	4/18	4/05
28	5/08	5/02	4/28	4/24	4/21	4/17	4/13	4/09	4/03
24	4/26	4/20	4/16	4/12	4/09	4/05	4/02	3/28	3/22
20	4/12	4/07	4/04	4/01	3/29	3/26	3/23	3/20	3/15
16	4/10	4/05	4/01	3/29	3/26	3/23	3/20	3/17	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	9/08	9/16	9/22	9/27	10/02	10/06	10/11	10/17	10/25
32	9/27	10/04	10/09	10/13	10/17	10/21	10/26	10/31	11/07
28	10/11	10/17	10/22	10/26	10/29	11/02	11/05	11/10	11/16
24	10/18	10/24	10/29	11/02	11/05	11/09	11/12	11/17	11/23
20	10/25	10/31	11/04	11/08	11/11	11/14	11/18	11/22	11/27
16	11/04	11/09	11/14	11/17	11/20	11/24	11/27	12/01	12/07

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	166	152	142	133	124	116	107	97	82
32	202	186	174	164	155	146	136	124	108
28	215	206	201	195	191	186	181	175	167
24	236	227	220	215	210	205	199	193	184
20	251	242	236	231	226	221	216	210	202
16	263	254	248	243	238	233	228	222	214

***** 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

Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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: DULUTH HARBOR STA, MN **COOP ID: 212246**

Climate Division: MN 3 **NWS Call Sign:** **Elevation: 610 Feet** **Lat: 46˚46N** **Lon: 92˚05W**

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	1693	1356	1197	794	516	231	72	88	274	614	1036	1500	9371
60	1538	1216	1042	644	367	122	20	30	158	459	886	1345	7827
57	1445	1132	949	554	285	74	8	14	103	369	796	1252	6981
55	1383	1076	887	496	234	50	3	7	74	310	736	1190	6446
50	1228	936	732	353	129	14	0	1	25	182	588	1035	5223
32	686	466	236	32	1	0	0	0	0	4	166	517	2108

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	16	34	62	227	509	775	1047	1032	731	413	120	41	5007
55	0	0	0	1	28	135	336	326	115	7	0	0	948
57	0	0	0	0	17	99	280	270	84	3	0	0	753
60	0	0	0	0	7	57	199	194	49	1	0	0	507
65	0	0	0	0	0	16	96	97	15	0	0	0	224
70	0	0	0	0	0	2	31	34	3	0	0	0	70

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	0	4	66	279	536	779	794	517	219	26	0	0	0	4	70	349	885	1664	2458	2975	3194	3220	3220
45	0	0	0	24	160	386	624	639	369	111	7	0	0	0	0	24	184	570	1194	1833	2202	2313	2320	2320
50	0	0	0	8	78	249	470	484	233	41	0	0	0	0	0	8	86	335	805	1289	1522	1563	1563	1563
55	0	0	0	1	33	136	321	331	121	6	0	0	0	0	0	1	34	170	491	822	943	949	949	949
60	0	0	0	0	9	60	192	192	48	0	0	0	0	0	0	0	9	69	261	453	501	501	501	501
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	1	36	130	279	490	489	263	78	5	0	0	0	1	37	167	446	936	1425	1688	1766	1771	1771

(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:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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