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: DUNN CENTER 2 SW, ND **COOP ID: 322365**

Climate Division: ND 4 **NWS Call Sign:** **Elevation: 2,232 Feet** **Lat: 47˚21N** **Lon: 102˚39W**

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	23.7	1.9	12.8	56+	1981	24	26.4	1992	-46	1959	31	-4.6	1982	1619	0	.0	.0	.4	20.8	30.8	14.3
Feb	30.7	9.7	20.2	65	1958	26	32.0	1984	-46	1959	1	3.1	1979	1255	0	.0	.0	2.0	14.4	27.7	8.9
Mar	41.3	19.2	30.3	80	1993	24	40.4	1986	-35	1962	1	20.9	1996	1078	0	.0	.0	8.5	8.5	28.9	3.7
Apr	56.7	31.2	44.0	96	1949	30	52.2	1987	-14	1975	2	34.2	1975	632	1	.0	@	20.4	1.2	17.9	.3
May	69.5	42.8	56.2	98+	1980	23	63.0	1977	12	1954	3	49.6	1996	303	28	.0	.8	29.3	.0	4.0	.0
Jun	77.8	51.3	64.6	107	1988	23	77.4	1988	30	1950	3	58.5	1985	120	107	.4	2.8	30.0	.0	.1	.0
Jul	84.7	55.7	70.2	108	1988	27	76.5	1989	35	1967	3	62.8	1993	35	196	.9	7.8	31.0	.0	.0	.0
Aug	85.3	54.8	70.1	110	1949	8	76.0	1983	29	1950	19	64.2	1977	49	206	.8	9.0	31.0	.0	.0	.0
Sep	72.9	43.8	58.4	107	1948	16	65.5	1998	14	1974	30	52.9	1984	242	43	.2	2.4	28.9	.0	2.9	.0
Oct	58.8	32.9	45.9	96	1953	2	49.9	1973	-5	1991	30	41.6	1972	593	0	.0	.1	23.3	.8	15.1	.1
Nov	39.1	18.4	28.8	77	1975	6	40.4	1999	-23	1964	29	17.4	1985	1088	0	.0	.0	6.1	9.5	27.3	2.7
Dec	27.8	6.4	17.1	61	1979	5	29.6	1999	-38	1983	23	-.7	1983	1484	0	.0	.0	1.0	18.2	30.6	10.5
Ann	55.7	30.7	43.2	110	Aug 1949	8	77.4	Jun 1988	-46+	Feb 1959	1	-4.6	Jan 1982	8498	581	2.3	22.9	211.9	73.4	185.3	40.5

\+ 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	.40	.37	.75	1949	8	1.05	1982	.04	1985
Feb	.41	.34	1.50	1998	25	2.39	1998	.01	1985
Mar	.68	.61	1.04	1975	28	2.53	1975	.00	1981
Apr	1.52	1.32	1.90	1997	5	4.79	1975	.01	1988
May	2.30	2.00	2.58	1965	6	5.00	1995	.06	1980
Jun	3.26	3.24	3.13	1962	15	5.50	1998	.75	1995
Jul	2.13	1.58	2.50	1997	1	6.66	1993	.02	1984
Aug	1.72	1.73	3.73	1964	30	3.44+	1980	.29	1994
Sep	1.57	1.14	2.36	1971	5	4.86	1986	.04	1993
Oct	1.30	.85	2.58	1982	28	7.24	1982	.06	1978
Nov	.68	.54	.90	1974	1	2.04	1998	.00	1999
Dec	.39	.42	.57	1988	26	1.12	1977	.00	1986
Ann	16.36	15.27	3.73	Aug 1964	30	7.24	Oct 1982	.00+	Nov 1999

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	6.1	1.3	@	.0
Feb	5.6	1.2	.1	@
Mar	6.5	2.3	.2	@
Apr	7.7	4.0	.9	.2
May	9.7	5.3	1.5	.4
Jun	10.3	6.8	2.2	.9
Jul	8.3	4.9	1.5	.3
Aug	7.1	3.9	.8	.3
Sep	5.9	3.6	.9	.3
Oct	5.2	3.0	.8	.2
Nov	5.3	2.4	.3	.0
Dec	5.9	1.2	.1	.0
Ann	83.6	39.9	9.3	2.6

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	.06	.09	.15	.21	.26	.33	.40	.49	.61	.80	.99
Feb	.03	.05	.11	.16	.23	.30	.38	.49	.65	.91	1.16
Mar	.06	.14	.25	.35	.45	.56	.68	.83	1.03	1.35	1.66
Apr	.11	.20	.39	.60	.84	1.11	1.43	1.85	2.43	3.40	4.36
May	.30	.49	.81	1.14	1.47	1.85	2.28	2.82	3.54	4.72	5.87
Jun	1.22	1.52	1.96	2.32	2.67	3.02	3.41	3.85	4.42	5.29	6.09
Jul	.23	.39	.69	.99	1.31	1.66	2.08	2.61	3.32	4.49	5.64
Aug	.35	.51	.76	1.00	1.23	1.48	1.76	2.10	2.54	3.26	3.94
Sep	.19	.31	.53	.75	.98	1.24	1.54	1.91	2.42	3.25	4.06
Oct	.08	.15	.31	.48	.68	.92	1.21	1.57	2.09	2.96	3.84
Nov	.04	.10	.20	.30	.41	.53	.67	.84	1.07	1.46	1.83
Dec	.03	.07	.14	.19	.25	.32	.39	.48	.60	.80	.99
Ann	10.49	11.58	13.01	14.10	15.09	16.05	17.05	18.17	19.54	21.55	23.30

+ 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	6.0	2.9	6	4	8.0	1989	7	21.5	1982	23	1982	26	19	1978	4.8	2.5	.6	.1	.0	22.1	15.6	12.2	3.6
Feb	5.7	5.1	6	3	11.5	1998	25	18.0	1979	31	1978	28	27	1978	4.2	2.2	.5	.2	@	16.7	12.3	9.7	4.7
Mar	7.2	4.5	4	1	14.0	1975	28	32.0	1975	34	1978	8	20	1978	4.2	2.9	.9	.3	@	11.0	7.9	5.9	2.9
Apr	3.9	2.3	1	#	13.5	1984	27	21.5	1984	21	1984	28	10	1975	1.8	1.4	.4	.2	@	3.4	2.4	1.8	.8
May	.4	.0	#	0	6.0	1983	12	8.0	1983	5	1983	12	#+	1996	.2	.2	.1	@	.0	.2	.1	@	.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	.4	.0	#	0	10.0	1972	26	10.0	1972	8	1972	26	#+	1995	.1	.1	@	@	@	.1	@	@	.0
Oct	1.8	.5	#	#	7.0	1980	23	9.6	1991	9	1985	10	1	1991	.9	.7	.1	.1	.0	1.3	.4	.3	.0
Nov	5.6	4.8	2	1	8.5	1977	20	15.5	1977	14+	1993	26	6	1986	3.8	2.4	.8	.3	.0	9.3	5.8	3.4	1.0
Dec	6.0	6.0	3	2	7.0	1972	30	14.0	1977	19	1977	31	16	1977	4.7	2.5	.4	.1	.0	19.6	13.8	9.6	2.8
Ann	37.0	26.1	N/A	N/A	14.0	Mar 1975	28	32.0	Mar 1975	34	Mar 1978	8	27	Feb 1978	24.7	14.9	3.8	1.3	@	83.7	58.3	42.9	15.8

+ 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	6/10	6/04	5/31	5/27	5/23	5/20	5/16	5/11	5/05
32	5/28	5/23	5/19	5/16	5/13	5/10	5/07	5/03	4/28
28	5/19	5/14	5/11	5/08	5/05	5/03	4/30	4/27	4/22
24	5/06	5/02	4/28	4/25	4/23	4/20	4/17	4/14	4/09
20	4/21	4/18	4/15	4/13	4/11	4/09	4/07	4/04	4/01
16	4/15	4/11	4/08	4/06	4/03	4/01	3/29	3/26	3/22

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	8/29	9/03	9/06	9/09	9/11	9/14	9/17	9/20	9/25
32	9/09	9/13	9/16	9/19	9/22	9/24	9/27	9/30	10/05
28	9/17	9/23	9/27	9/30	10/03	10/06	10/09	10/13	10/18
24	9/20	9/27	10/02	10/07	10/11	10/14	10/19	10/24	10/31
20	9/28	10/05	10/09	10/13	10/17	10/21	10/25	10/30	11/05
16	10/10	10/16	10/21	10/25	10/28	11/01	11/05	11/09	11/16

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	133	125	120	115	111	106	102	96	89
32	153	145	140	135	131	127	122	117	109
28	171	164	158	154	150	146	141	136	129
24	197	187	181	175	170	165	159	153	144
20	211	203	198	193	188	184	179	173	165
16	232	224	217	212	207	202	197	191	182

***** 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	1619	1255	1078	632	303	120	35	49	242	593	1088	1484	8498
60	1464	1115	923	489	190	55	10	17	142	439	938	1329	7111
57	1371	1031	830	407	136	31	3	8	94	348	848	1236	6343
55	1309	980	769	355	105	20	1	4	69	289	788	1174	5863
50	1162	850	626	240	48	6	0	1	25	161	647	1020	4786
32	661	424	208	23	0	0	0	0	0	4	224	519	2063

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	65	93	154	382	748	977	1184	1180	791	434	126	57	6191
55	0	4	1	24	140	307	472	471	170	6	0	0	1595
57	0	0	0	16	109	257	412	413	136	3	0	0	1346
60	0	0	0	8	70	192	326	329	93	1	0	0	1019
65	0	0	0	1	28	107	196	206	43	0	0	0	581
70	0	0	0	0	8	46	102	113	16	0	0	0	285

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	1	30	179	494	732	930	912	545	223	26	0	0	1	31	210	704	1436	2366	3278	3823	4046	4072	4072
45	0	0	8	97	352	582	775	757	403	124	9	0	0	0	8	105	457	1039	1814	2571	2974	3098	3107	3107
50	0	0	2	46	223	434	620	602	276	59	0	0	0	0	2	48	271	705	1325	1927	2203	2262	2262	2262
55	0	0	0	18	124	290	465	450	165	21	0	0	0	0	0	18	142	432	897	1347	1512	1533	1533	1533
60	0	0	0	4	54	166	314	302	83	5	0	0	0	0	0	4	58	224	538	840	923	928	928	928
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	1	34	135	306	447	591	578	348	160	26	0	0	1	35	170	476	923	1514	2092	2440	2600	2626	2626

(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