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: NEW SALEM 5 NW, ND **COOP ID: 326365**

Climate Division: ND 8 **NWS Call Sign:** **Elevation: 2,150 Feet** **Lat: 46˚54N** **Lon: 101˚29W**

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	19.4	-1.9	8.8	62	1981	23	21.9	1992	-40	1970	18	-7.4	1982	1745	0	.0	.0	.3	21.8	30.9	15.0
Feb	26.6	5.1	15.9	68+	1992	27	30.1	1998	-35+	1996	3	1.0	1979	1376	0	.0	.0	1.8	15.5	27.7	9.1
Mar	38.3	16.2	27.3	81	1967	29	37.2	1986	-30	1962	1	18.1	1996	1171	0	.0	.0	7.8	9.2	29.1	3.3
Apr	54.2	29.0	41.6	92+	1987	18	50.8	1987	-14	1975	2	32.0	1975	703	1	.0	.1	20.2	1.4	18.9	.3
May	67.7	41.8	54.8	97	1969	27	62.5	1977	10	1967	3	49.1	1979	334	16	.0	.5	29.3	.0	4.4	.0
Jun	76.3	50.7	63.5	104	1988	27	75.6	1988	24	1969	20	58.8	1993	131	86	.3	2.7	30.0	.0	.2	.0
Jul	82.7	55.5	69.1	106	1949	2	74.7	1989	32	1972	4	61.5	1992	44	172	.9	7.5	31.0	.0	@	.0
Aug	81.9	53.6	67.8	107	1949	7	74.8	1983	32	1963	31	61.5	1974	82	168	.6	7.7	31.0	.0	.0	.0
Sep	71.1	43.3	57.2	106	1978	5	63.4	1998	10	1974	30	51.8	1985	263	29	.2	1.7	29.2	.0	2.8	.0
Oct	56.9	30.5	43.7	96	1963	4	47.3	2000	-5	1991	30	37.7	1991	660	0	.0	.1	23.1	.7	15.6	.1
Nov	36.2	15.8	26.0	82	1999	8	39.1	1999	-26	1985	29	12.1	1985	1171	0	.0	.0	5.9	10.8	28.0	2.6
Dec	23.6	3.1	13.4	65	1979	4	26.3	1997	-38	1983	23	-3.4	1983	1602	0	.0	.0	.9	20.0	30.9	10.7
Ann	52.9	28.6	40.8	107	Aug 1949	7	75.6	Jun 1988	-40	Jan 1970	18	-7.4	Jan 1982	9282	472	2.0	20.3	210.5	79.4	188.5	41.1

\+ 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: 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	.47	.47	.74	1976	1	1.12	1976	.02	1974
Feb	.49	.32	1.00	1951	28	2.12	1998	.04	1985
Mar	.81	.53	2.14	1977	29	2.74	1977	.02	1981
Apr	1.88	1.49	2.02	1975	28	4.74	1975	.08	1987
May	2.42	2.12	3.18	1970	8	5.12	1999	.18	1984
Jun	3.17	2.71	3.13	1956	30	5.75	1976	1.32	1989
Jul	2.76	2.33	3.05	1993	22	10.40	1993	.57	1971
Aug	2.11	1.57	2.65	1968	23	8.19	1980	.15	1971
Sep	1.53	1.19	2.15	1977	18	7.29	1977	.14	1974
Oct	1.38	.86	2.36	1998	5	5.90	1994	.04+	1993
Nov	.76	.59	.95	1974	1	2.64	1986	.01	1990
Dec	.50	.45	.80	1972	29	1.51	1972	.03	1986
Ann	18.28	17.68	3.18	May 1970	8	10.40	Jul 1993	.01	Nov 1990

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	5.7	1.6	@	.0
Feb	5.4	1.9	.1	.0
Mar	6.4	2.2	.4	@
Apr	7.4	4.4	1.0	.3
May	8.7	5.6	1.7	.2
Jun	10.5	6.9	2.1	.6
Jul	8.8	5.6	1.9	.5
Aug	7.2	4.5	1.2	.5
Sep	6.6	3.6	.8	.4
Oct	5.6	3.0	.7	.3
Nov	5.9	2.2	.3	.0
Dec	6.2	1.5	.1	.0
Ann	84.4	43.0	10.3	2.8

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	.10	.17	.23	.30	.38	.47	.58	.73	.97	1.20
Feb	.06	.10	.16	.23	.30	.39	.48	.59	.75	1.01	1.26
Mar	.05	.10	.20	.31	.44	.58	.76	.98	1.29	1.81	2.33
Apr	.22	.36	.62	.89	1.17	1.48	1.84	2.30	2.92	3.93	4.93
May	.46	.68	1.03	1.36	1.69	2.05	2.46	2.95	3.61	4.66	5.65
Jun	1.42	1.70	2.09	2.41	2.71	3.00	3.33	3.69	4.16	4.86	5.49
Jul	.63	.88	1.29	1.65	2.01	2.40	2.83	3.34	4.02	5.10	6.11
Aug	.27	.43	.73	1.02	1.33	1.68	2.08	2.57	3.24	4.34	5.40
Sep	.23	.36	.58	.79	1.01	1.25	1.53	1.87	2.33	3.07	3.78
Oct	.05	.11	.26	.43	.65	.90	1.22	1.64	2.25	3.29	4.35
Nov	.03	.06	.14	.24	.36	.50	.67	.90	1.23	1.80	2.37
Dec	.06	.09	.16	.23	.31	.39	.49	.61	.77	1.05	1.31
Ann	11.71	12.93	14.52	15.75	16.85	17.92	19.04	20.29	21.82	24.06	26.02

\+ 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

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	6.1	5.8	6	5
Feb	6.4	5.3	5	3
Mar	6.9	4.5	3	1
Apr	4.7	3.0	1	#
May	.4	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	#	0
Aug	.0	.0	0	0
Sep	.3	.0	#	0
Oct	2.5	.6	#	#
Nov	7.9	6.0	2	1
Dec	7.2	7.3	4	2
Ann	42.4	32.5	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	6.0	1976	1	15.0	1994	22	1997	30	20	1997
Feb	6.0	1979	22	18.0	1987	26	1978	20	23	1978
Mar	9.5	1996	24	25.0	1975	25	1979	4	18	1997
Apr	10.0	1997	6	21.5	1984	25	1975	3	9	1975
May	5.0	1991	3	5.0	1991	2	1983	12	#+	1996
Jun	.0	0	0	.0	0	0	0	0	0	0
Jul	.0	0	0	.0	0	1	1999	3	#	1999
Aug	.0	0	0	.0	0	0	0	0	0	0
Sep	3.0	1984	23	6.0	1984	3	1984	23	#+	1995
Oct	8.0	1991	29	25.0	1991	15	1991	29	2	1991
Nov	11.0	1986	8	32.0	1986	20	1993	26	9	1986
Dec	8.0	1972	29	15.0	1972	20	1977	11	16	1977
Ann	11.0	Nov 1986	8	32.0	Nov 1986	26	Feb 1978	20	23	Feb 1978

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	4.8	2.8	.7	.1	.0
Feb	4.5	2.9	.6	.1	.0
Mar	3.9	2.9	1.0	.4	.0
Apr	1.4	1.1	.6	.4	@
May	.1	.1	.1	@	.0
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.1	.1	.1	.0	.0
Oct	1.2	.8	.3	.1	.0
Nov	4.3	2.8	.9	.4	.1
Dec	5.4	2.8	.5	.1	.0
Ann	25.7	16.3	4.8	1.6	.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	22.3	14.5	12.5	6.5
Feb	16.7	10.5	8.7	4.5
Mar	10.2	7.3	5.6	2.4
Apr	3.6	2.6	2.1	.9
May	.1	.0	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.2	@	.0	.0
Oct	1.2	.5	.3	.1
Nov	10.0	6.6	3.8	2.0
Dec	16.8	9.8	5.5	3.1
Ann	81.1	51.8	38.5	19.5

+ 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	6/23	6/14	6/08	6/03	5/29	5/25	5/19	5/13	5/05
32	6/05	5/30	5/25	5/22	5/18	5/15	5/11	5/06	4/30
28	5/24	5/19	5/15	5/11	5/08	5/05	5/01	4/28	4/22
24	5/10	5/05	5/01	4/27	4/24	4/21	4/17	4/13	4/08
20	5/03	4/28	4/24	4/21	4/18	4/15	4/12	4/08	4/03
16	4/19	4/14	4/10	4/07	4/04	4/01	3/29	3/25	3/20

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	8/18	8/25	8/30	9/03	9/07	9/10	9/14	9/19	9/26
32	9/08	9/13	9/16	9/19	9/21	9/24	9/27	9/30	10/05
28	9/13	9/18	9/21	9/24	9/27	9/29	10/02	10/06	10/10
24	9/21	9/26	9/30	10/03	10/06	10/09	10/12	10/16	10/21
20	9/29	10/05	10/09	10/13	10/16	10/20	10/23	10/27	11/02
16	10/08	10/15	10/20	10/24	10/27	10/31	11/04	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	122	113	106	99	93	86	77	66
32	151	142	136	131	126	120	115	109	100
28	164	156	150	145	141	136	131	125	117
24	183	176	172	168	164	160	156	152	145
20	197	192	187	184	181	177	174	170	164
16	228	221	215	210	206	201	197	191	183

***** 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	1745	1376	1171	703	334	131	44	82	263	660	1171	1602	9282
60	1590	1236	1016	559	212	61	13	34	155	505	1021	1447	7849
57	1497	1152	923	476	153	33	6	18	103	413	931	1354	7059
55	1435	1096	861	423	119	21	1	11	74	353	871	1292	6557
50	1280	965	709	301	56	6	0	2	26	218	724	1137	5424
32	763	517	252	43	0	0	0	0	0	10	277	623	2485

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	41	65	104	331	705	945	1151	1108	756	374	96	44	5720
55	0	0	0	20	111	276	439	407	140	4	0	0	1397
57	0	0	0	14	83	228	382	352	109	2	0	0	1170
60	0	0	0	7	49	166	295	274	71	0	0	0	862
65	0	0	0	1	16	86	172	168	29	0	0	0	472
70	0	0	0	0	3	33	85	89	9	0	0	0	219

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	2	27	175	490	734	926	894	545	223	25	0	0	2	29	204	694	1428	2354	3248	3793	4016	4041	4041
45	0	0	6	98	348	584	771	739	404	121	9	0	0	0	6	104	452	1036	1807	2546	2950	3071	3080	3080
50	0	0	0	51	223	435	616	584	273	57	1	0	0	0	0	51	274	709	1325	1909	2182	2239	2240	2240
55	0	0	0	19	120	290	461	432	160	19	0	0	0	0	0	19	139	429	890	1322	1482	1501	1501	1501
60	0	0	0	7	57	167	314	288	84	3	0	0	0	0	0	7	64	231	545	833	917	920	920	920
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	2	28	138	315	456	593	571	349	160	24	0	0	2	30	168	483	939	1532	2103	2452	2612	2636	2636

(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