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: MARSHALL, NC **COOP ID: 315356**

Climate Division: NC 1 **NWS Call Sign:** **Elevation: 2,000 Feet** **Lat: 35˚48N** **Lon: 82˚40W**

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	45.5	21.0	33.3	77	1952	1	44.6	1974	-18	1985	21	19.8	1977	985	0	.0	.0	12.6	3.5	23.2	.5
Feb	49.9	22.3	36.1	80+	1989	15	43.9	1990	-11+	1996	6	26.4	1978	809	0	.0	.0	15.8	2.4	19.9	.2
Mar	58.3	28.7	43.5	90	1985	30	49.2	1997	-3+	1993	16	38.2	1971	668	0	.0	@	24.7	.5	15.0	.1
Apr	66.8	35.5	51.2	89+	1995	11	55.7	1981	19	1992	3	46.8	1983	416	0	.0	.0	28.3	@	7.3	.0
May	74.6	45.2	59.9	91+	1996	20	65.0	1991	27+	1997	5	55.5	1997	188	30	.0	.1	30.9	.0	.8	.0
Jun	81.3	54.2	67.8	98	1952	28	70.9	1994	31	1972	2	64.1	1972	29	111	.0	.7	30.0	.0	@	.0
Jul	84.9	59.4	72.2	102	1952	29	75.6	1993	41	1961	10	67.9	1976	2	224	.0	4.3	31.0	.0	.0	.0
Aug	83.8	58.1	71.0	100	1983	21	74.2	1995	42	1986	29	67.4	1976	5	189	@	2.9	31.0	.0	.0	.0
Sep	78.3	51.8	65.1	97	1954	6	70.0	1998	30	1967	30	60.4	1976	70	71	.0	1.0	30.0	.0	.1	.0
Oct	68.6	38.6	53.6	89	1953	2	61.0	1984	16+	1952	30	46.9	1988	364	10	.0	.0	30.6	.0	5.9	.0
Nov	58.2	30.4	44.3	81+	1974	3	53.0	1985	3+	1950	26	37.0	1976	621	0	.0	.0	24.2	.2	14.6	.0
Dec	49.1	24.2	36.7	77	1998	8	44.1	1971	-15+	1962	14	29.0	1989	879	0	.0	.0	16.9	1.8	21.0	.2
Ann	66.6	39.1	52.9	102	Jul 1952	29	75.6	Jul 1993	-18	Jan 1985	21	19.8	Jan 1977	5036	635	@	9.0	306.0	8.4	107.8	1.0

\+ 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	3.39	2.97	2.82	1996	27	7.06	1998	.96	1981
Feb	3.38	3.34	2.58	1984	14	6.11	1990	.86	1978
Mar	4.05	3.53	3.35	1965	26	8.56	1975	1.08	1988
Apr	3.31	3.13	3.92	1957	5	6.33	1983	.40	1976
May	3.89	3.74	2.47	1976	14	7.26	1976	1.27	1988
Jun	3.58	3.68	2.45	1949	17	6.62	1995	1.12	1990
Jul	3.76	3.53	2.54	1984	18	8.39	1984	1.48	1987
Aug	3.85	3.71	2.85	1961	25	7.71	1992	.90	1972
Sep	2.94	2.71	2.40	1963	29	6.76	1975	.19	1978
Oct	2.37	2.34	2.35	1995	5	5.42	1972	.04	2000
Nov	2.97	2.85	2.93	1977	6	7.26	1979	1.31	1997
Dec	2.77	3.04	2.18	1958	29	4.65	1990	.73+	1985
Ann	40.26	40.50	3.92	Apr 1957	5	8.56	Mar 1975	.04	Oct 2000

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	11.8	7.8	2.1	.5
Feb	10.6	7.2	2.4	.6
Mar	12.6	8.4	2.5	.9
Apr	10.7	7.7	2.2	.7
May	12.3	8.3	2.5	.7
Jun	12.2	8.1	2.6	.4
Jul	12.2	7.6	2.6	.8
Aug	11.3	7.7	2.6	.9
Sep	9.3	6.2	1.8	.6
Oct	7.8	5.0	1.5	.5
Nov	9.6	6.5	1.8	.6
Dec	10.7	6.7	1.6	.4
Ann	131.1	87.2	26.2	7.6

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	1.23	1.55	2.01	2.39	2.76	3.14	3.55	4.02	4.63	5.57	6.43
Feb	1.16	1.48	1.95	2.34	2.72	3.10	3.52	4.02	4.65	5.63	6.52
Mar	1.61	1.99	2.52	2.95	3.37	3.79	4.24	4.76	5.43	6.45	7.37
Apr	.93	1.24	1.72	2.13	2.54	2.96	3.43	3.98	4.70	5.82	6.87
May	1.55	1.91	2.42	2.84	3.23	3.64	4.07	4.57	5.21	6.18	7.07
Jun	1.48	1.81	2.27	2.65	3.01	3.37	3.76	4.21	4.77	5.64	6.43
Jul	1.53	1.88	2.36	2.76	3.14	3.52	3.94	4.41	5.01	5.93	6.77
Aug	1.17	1.53	2.08	2.55	3.00	3.48	4.00	4.61	5.40	6.64	7.79
Sep	.64	.91	1.34	1.73	2.12	2.54	3.01	3.57	4.31	5.48	6.60
Oct	.36	.56	.90	1.23	1.57	1.94	2.37	2.89	3.60	4.74	5.84
Nov	1.35	1.61	1.97	2.27	2.54	2.82	3.11	3.45	3.88	4.52	5.10
Dec	.84	1.11	1.50	1.83	2.16	2.50	2.88	3.31	3.88	4.77	5.59
Ann	31.05	32.88	35.20	36.94	38.48	39.95	41.45	43.10	45.09	47.95	50.40

\+ 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)

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median
Jan	5.1	3.3	1	#
Feb	5.1	3.0	#	#
Mar	3.9	1.0	#	#
Apr	1.0	.0	#	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	.0	.0	#	0
Nov	.5	.0	#	0
Dec	3.5	.4	#	#
Ann	19.1	7.7	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	12.0	1998	28	18.7	2000	13	1998	1	3	1996
Feb	7.2	1979	7	21.1	1979	8	1985	13	3	1979
Mar	13.0	1993	13	22.0+	1999	22	1993	14	3	1993
Apr	11.5	1987	4	22.2	1987	16	1987	4	1	1987
May	.0	0	0	.0	0	0	0	0	0	0
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	.5	1993	31	.5	1993	1	1993	31	#	1993
Nov	3.0	1975	14	6.0	1975	3	1975	23	#+	2000
Dec	7.0	1997	30	22.5	1997	9+	1997	31	1+	2000
Ann	13.0	Mar 1993	13	22.5	Dec 1997	22	Mar 1993	14	3+	Jan 1996

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	2.6	1.8	.7	.3	@
Feb	2.3	1.7	.5	.2	.0
Mar	1.5	1.2	.4	.2	@
Apr	.3	.2	.1	@	@
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	@	.0	.0	.0	.0
Nov	.4	.2	.1	.0	.0
Dec	1.4	1.0	.4	.2	.0
Ann	8.5	6.1	2.2	.9	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	2.9	1.5	.6	.1
Feb	2.5	1.1	.3	.0
Mar	1.1	.5	.3	.2
Apr	.2	.1	.1	@
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	@	.0	.0	.0
Nov	.2	.1	.0	.0
Dec	1.2	.3	.2	.0
Ann	8.1	3.6	1.5	.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	5/24	5/19	5/16	5/13	5/11	5/08	5/05	5/02	4/27
32	5/16	5/10	5/07	5/03	4/30	4/27	4/24	4/20	4/15
28	5/02	4/26	4/23	4/19	4/16	4/13	4/09	4/05	3/31
24	4/13	4/08	4/04	4/01	3/29	3/26	3/23	3/19	3/13
20	4/02	3/27	3/22	3/18	3/15	3/11	3/08	3/03	2/25
16	3/20	3/12	3/05	2/28	2/22	2/17	2/12	2/05	1/27

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	9/24	9/27	9/30	10/02	10/04	10/06	10/09	10/11	10/15
32	9/30	10/04	10/07	10/10	10/12	10/14	10/17	10/20	10/24
28	10/08	10/14	10/18	10/21	10/24	10/27	10/31	11/04	11/09
24	10/17	10/23	10/28	11/01	11/05	11/09	11/13	11/17	11/24
20	11/04	11/09	11/13	11/16	11/19	11/22	11/25	11/28	12/03
16	11/16	11/22	11/27	12/02	12/06	12/10	12/14	12/19	12/26

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	163	157	153	149	146	143	139	135	129
32	182	176	171	168	164	160	156	152	146
28	212	205	199	195	190	186	182	176	169
24	246	237	231	225	220	215	210	204	195
20	273	264	258	253	248	243	238	232	223
16	318	307	299	292	285	279	272	264	253

***** 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	985	809	668	416	188	29	2	5	70	364	621	879	5036
60	830	669	513	270	91	4	0	0	22	234	473	724	3830
57	741	585	424	191	51	1	0	0	9	170	387	631	3190
55	685	529	366	145	32	0	0	0	4	133	332	570	2796
50	540	398	232	58	7	0	0	0	1	64	208	427	1935
32	156	64	10	0	0	0	0	0	0	0	7	71	308

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	194	179	365	575	865	1073	1245	1207	991	669	376	215	7954
55	9	0	8	30	185	383	532	494	306	89	11	1	2048
57	4	0	4	16	142	324	470	432	250	64	6	0	1712
60	0	0	0	5	88	237	377	339	173	35	2	0	1256
65	0	0	0	0	30	111	224	189	71	10	0	0	635
70	0	0	0	0	6	31	94	70	17	1	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	69	109	256	429	682	882	1036	1007	802	490	241	110	69	178	434	863	1545	2427	3463	4470	5272	5762	6003	6113
45	31	50	153	296	527	732	881	852	652	342	137	53	31	81	234	530	1057	1789	2670	3522	4174	4516	4653	4706
50	2	21	77	178	377	582	726	697	503	212	66	25	2	23	100	278	655	1237	1963	2660	3163	3375	3441	3466
55	0	2	33	90	236	432	571	542	355	107	26	5	0	2	35	125	361	793	1364	1906	2261	2368	2394	2399
60	0	0	4	35	119	288	416	387	223	44	2	0	0	0	4	39	158	446	862	1249	1472	1516	1518	1518
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	49	90	182	290	436	584	708	679	522	326	165	78	49	139	321	611	1047	1631	2339	3018	3540	3866	4031	4109

(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