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: BOLIVAR WATERWORKS, TN **COOP ID: 400876**

Climate Division: TN 4 **NWS Call Sign:** **Elevation: 455 Feet** **Lat: 35˚16N** **Lon: 88˚59W**

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	47.3	27.3	37.3	80	1943	24	45.4	1990	-14	1948	18	25.2	1977	858	0	.0	.0	13.5	3.7	21.4	.3
Feb	52.8	30.6	41.7	85	1954	10	49.6	1976	-18	1951	2	29.9	1978	652	0	.0	.0	16.8	2.2	15.9	.0
Mar	61.9	39.1	50.5	86+	1939	23	56.5	1973	9	1943	4	43.6	1996	456	6	.0	.0	25.9	.2	8.5	.0
Apr	71.2	47.7	59.5	92	1987	22	65.4	1981	24	1950	14	53.6	1983	197	30	.0	.1	29.3	.0	1.6	.0
May	78.7	56.6	67.7	98+	1937	30	72.8	1987	32+	1944	7	61.9	1976	67	148	.0	.8	31.0	.0	.0	.0
Jun	86.3	65.1	75.7	106	1936	19	80.2	1998	42+	1946	5	71.2	1974	2	322	.1	9.6	30.0	.0	.0	.0
Jul	89.9	69.2	79.6	109	1930	29	84.3	1980	43+	1944	22	76.8	1972	0	450	.6	17.8	31.0	.0	.0	.0
Aug	89.1	66.9	78.0	109+	1930	9	82.6	1983	42	1946	31	73.6	1992	1	404	.8	15.3	31.0	.0	.0	.0
Sep	83.2	59.6	71.4	103+	1951	1	77.6	1998	28	1942	29	65.4	1974	26	219	.1	6.4	30.0	.0	.0	.0
Oct	73.3	46.9	60.1	97	1941	1	66.4	1971	20+	1952	29	53.4	1976	203	52	.0	.4	30.8	.0	2.0	.0
Nov	61.3	38.3	49.8	87	1961	2	56.1	1985	2	1950	25	39.7	1976	459	4	.0	.0	24.7	.1	9.5	.0
Dec	51.0	31.0	41.0	81	1951	31	50.2	1984	-7	1989	22	30.5	1989	744	0	.0	.0	17.3	1.9	17.7	.2
Ann	70.5	48.2	59.4	109+	Aug 1930	9	84.3	Jul 1980	-18	Feb 1951	2	25.2	Jan 1977	3665	1635	1.6	50.4	311.3	8.1	76.6	.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: 1930-2001

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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	4.29	3.86	8.35	1935	20	10.17	1999	.42	1986
Feb	4.30	3.91	4.00	1990	3	10.45	1990	.57	1978
Mar	5.77	5.28	5.23	1975	13	13.54	1975	2.14	1986
Apr	5.20	4.74	4.87	1942	9	10.85	1991	1.99	1978
May	5.65	4.71	4.11	1963	26	11.93	1991	1.24	1977
Jun	4.43	4.30	4.40	1932	3	10.47	1992	.00	1988
Jul	4.06	3.25	4.75	1967	5	9.56	1989	.71	1977
Aug	3.04	2.58	5.00	1931	7	8.12	1971	.14	1999
Sep	4.21	3.04	6.37	1958	20	13.05	1977	.42	1998
Oct	3.38	2.93	5.00	1935	23	10.14	1984	.20	1971
Nov	5.25	5.41	5.55	1948	19	9.69	1986	1.41	1971
Dec	5.51	4.87	5.03	1978	4	12.40	1982	1.23	1980
Ann	55.09	53.21	8.35	Jan 1935	20	13.54	Mar 1975	.00	Jun 1988

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	10.6	7.2	3.3	1.2
Feb	9.1	6.6	3.2	1.2
Mar	11.4	8.1	3.7	1.7
Apr	10.1	7.4	3.8	1.4
May	10.8	7.8	3.7	1.8
Jun	8.8	6.1	3.0	1.4
Jul	8.9	6.1	2.9	1.2
Aug	7.4	5.0	2.2	.9
Sep	8.0	5.7	2.8	1.3
Oct	7.3	4.9	2.7	1.0
Nov	9.6	6.6	3.7	1.7
Dec	10.8	7.5	3.6	1.8
Ann	112.8	79.0	38.6	16.6

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	1.16	1.57	2.19	2.73	3.27	3.82	4.44	5.18	6.13	7.63	9.03
Feb	1.12	1.53	2.15	2.70	3.24	3.81	4.44	5.19	6.17	7.71	9.15
Mar	2.26	2.79	3.55	4.18	4.78	5.38	6.04	6.80	7.77	9.25	10.59
Apr	1.71	2.20	2.92	3.54	4.14	4.75	5.42	6.21	7.22	8.79	10.24
May	1.86	2.40	3.19	3.85	4.50	5.16	5.89	6.74	7.83	9.52	11.08
Jun	1.24	1.88	2.59	3.14	3.65	4.16	4.72	5.35	6.17	7.41	8.55
Jul	1.13	1.52	2.10	2.61	3.11	3.63	4.21	4.89	5.78	7.17	8.46
Aug	.42	.67	1.11	1.53	1.97	2.46	3.02	3.72	4.65	6.18	7.66
Sep	.73	1.10	1.72	2.29	2.88	3.52	4.25	5.14	6.32	8.23	10.05
Oct	.67	.98	1.47	1.93	2.39	2.88	3.44	4.12	5.01	6.45	7.81
Nov	1.67	2.17	2.91	3.54	4.15	4.78	5.47	6.28	7.32	8.95	10.45
Dec	1.67	2.19	2.97	3.65	4.30	4.98	5.73	6.61	7.75	9.52	11.17
Ann	42.08	44.67	47.96	50.42	52.59	54.68	56.82	59.17	62.01	66.08	69.58

\+ 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: 1930-2001
(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	.7	.0	#	0	6.3	1988	7	6.3	1988	6	1988	7	1	1988	.5	.3	.2	@	.0	.3	.1	.1	.0
Feb	.9	.0	#	0	3.8	1985	12	9.1	1985	5	1985	2	5	1985	.6	.4	.1	.0	.0	.3	.1	.0	.0
Mar	.0	.0	#	0	.1	1980	2	.1	1980	1	1980	2	#+	1999	@	.0	.0	.0	.0	@	.0	.0	.0
Apr	#	.0	0	0	#	1987	3	#+	1987	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
May	.0	.0	0	0	.0	0	0	.0	0	0	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	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Oct	#	.0	0	0	#	1993	31	#+	1993	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Nov	.1	.0	#	0	1.5	1971	24	2.2	1971	#+	1991	7	#+	1991	.1	@	.0	.0	.0	.0	.0	.0	.0
Dec	.1	#	#	0	1.0	1989	8	1.0	1989	1	1989	8	#+	2000	.1	@	.0	.0	.0	@	.0	.0	.0
Ann	1.8	#	N/A	N/A	6.3	Jan 1988	7	9.1	Feb 1985	6	Jan 1988	7	5	Feb 1985	1.3	.7	.3	@	.0	.6	.2	.1	.0

+ 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	4/27	4/23	4/20	4/17	4/15	4/12	4/10	4/07	4/03
32	4/17	4/13	4/10	4/08	4/05	4/03	3/31	3/28	3/24
28	4/05	3/31	3/27	3/24	3/21	3/18	3/14	3/10	3/05
24	3/20	3/13	3/08	3/04	2/28	2/24	2/19	2/14	2/07
20	3/12	3/04	2/26	2/21	2/16	2/12	2/06	1/31	1/23
16	3/01	2/20	2/14	2/08	2/03	1/29	1/23	1/14	0/00

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	10/02	10/07	10/09	10/12	10/14	10/17	10/19	10/22	10/26
32	10/08	10/14	10/18	10/22	10/25	10/29	11/01	11/06	11/12
28	10/27	11/01	11/05	11/09	11/12	11/15	11/18	11/22	11/28
24	11/07	11/13	11/17	11/21	11/25	11/28	12/02	12/06	12/12
20	11/11	11/20	11/27	12/03	12/09	12/14	12/20	12/27	1/05
16	12/05	12/14	12/20	12/26	1/01	1/06	1/13	1/22	0/00

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	196	191	188	185	182	179	176	172	167
32	221	214	210	206	202	198	194	190	184
28	257	250	244	240	235	231	226	221	213
24	298	288	281	275	269	263	257	250	240
20	332	317	308	300	293	286	278	270	258
16	>365	>365	357	340	330	321	314	305	294

***** 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	858	652	456	197	67	2	0	1	26	203	459	744	3665
60	705	516	317	101	23	0	0	0	6	112	323	595	2698
57	621	438	244	60	10	0	0	0	2	72	249	508	2204
55	563	387	201	39	6	0	0	0	1	51	205	452	1905
50	426	271	115	11	0	0	0	0	0	17	117	321	1278
32	93	32	3	0	0	0	0	0	0	0	2	45	175

Base — Cooling Degree Days (1)

Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	258	304	577	823	1104	1310	1473	1426	1183	871	537	323	10189
55	15	16	62	173	397	620	760	713	493	209	50	17	3525
57	11	11	43	133	340	560	698	651	435	168	33	12	3095
60	2	4	23	84	259	470	605	558	349	115	17	6	2492
65	0	0	6	30	148	322	450	404	219	52	4	0	1635
70	0	0	0	7	69	183	295	257	116	18	0	0	945

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	110	180	369	598	870	1080	1234	1188	948	635	332	157	110	290	659	1257	2127	3207	4441	5629	6577	7212	7544	7701
45	55	106	244	454	715	930	1079	1033	798	483	216	86	55	161	405	859	1574	2504	3583	4616	5414	5897	6113	6199
50	25	54	149	316	560	780	924	878	648	336	126	40	25	79	228	544	1104	1884	2808	3686	4334	4670	4796	4836
55	8	24	76	195	405	630	769	723	500	216	69	17	8	32	108	303	708	1338	2107	2830	3330	3546	3615	3632
60	0	2	34	106	263	480	614	568	359	117	28	2	0	2	36	142	405	885	1499	2067	2426	2543	2571	2573
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	69	118	229	372	571	745	853	816	633	413	210	93	69	187	416	788	1359	2104	2957	3773	4406	4819	5029	5122

(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