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: NEWARK UNIVERSITY FARM, DE **COOP ID: 076410**

Climate Division: DE 1 **NWS Call Sign:** **Elevation: 90 Feet** **Lat: 39˚40N** **Lon: 75˚44W**

Temperature (˚F)

Month	Mean (1) Daily Max	Mean (1) Daily Min	Mean (1) Mean	Extremes Highest Daily(2)	Extremes Year	Extremes Day	Extremes Highest Month(1) Mean	Extremes Year	Extremes Lowest Daily(2)	Extremes Year	Extremes Day	Extremes Lowest Month(1) Mean	Extremes Year	Degree Days (1) Base Temp 65 Heating	Degree Days (1) Base Temp 65 Cooling	Mean Number of Days (3) Max >= 100	Max >= 90	Max >= 50	Max <= 32	Min <= 32	Min <= 0
Jan	41.5	23.5	32.5	75	1950	26	41.0	1998	-10	1984	22	21.9	1977	1008	0	.0	.0	6.7	5.9	25.5	.6
Feb	45.2	25.2	35.2	79	1976	17	42.7	1990	-8+	1961	2	23.5	1979	834	0	.0	.0	9.1	3.9	21.3	.2
Mar	54.6	32.1	43.4	89	1998	30	49.0	2000	4	1984	10	37.2	1984	670	0	.0	.0	20.6	.4	16.3	.0
Apr	65.7	40.5	53.1	93	1976	18	58.2	1994	14	1982	7	47.9	1975	359	2	.0	.2	28.7	.0	4.8	.0
May	75.9	50.7	63.3	97	1962	18	69.5	1991	28	1978	1	59.7	1973	111	59	.0	1.4	31.0	.0	.1	.0
Jun	83.7	59.8	71.8	100	1957	18	76.5	1994	38	1972	11	67.9	1972	10	213	.0	5.1	30.0	.0	.0	.0
Jul	87.6	65.1	76.4	105	1983	16	81.1	1999	41	1988	1	73.1	1976	0	351	.5	11.2	31.0	.0	.0	.0
Aug	85.5	63.5	74.5	103	2001	9	78.0	1980	42+	1986	29	71.3	1982	0	294	.1	7.2	31.0	.0	.0	.0
Sep	78.7	56.6	67.7	100+	1953	2	71.9	1980	33+	1951	30	64.3	1984	33	112	.1	1.9	30.0	.0	.0	.0
Oct	67.7	44.4	56.1	90	1959	5	61.5	1971	23	1969	24	50.8	1988	294	16	.0	.0	30.7	.0	2.2	.0
Nov	56.6	36.0	46.3	85	1950	1	50.9	1975	12	1955	29	40.0	1976	560	0	.0	.0	22.1	.1	10.9	.0
Dec	46.0	28.1	37.1	74+	1984	29	44.0	1984	-6	1983	25	25.2	1989	867	0	.0	.0	10.9	2.5	21.3	.1
Ann	65.7	43.8	54.8	105	Jul 1983	16	81.1	Jul 1999	-10	Jan 1984	22	21.9	Jan 1977	4746	1047	.7	27.0	281.8	12.8	102.4	.9

\+ 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	3.47	2.89	2.21	1995	20	8.86	1979	.56	1981
Feb	2.73	2.49	2.25	1984	15	6.32	1971	.77	1980
Mar	4.04	4.48	3.75	1958	20	8.38	2000	1.26	1981
Apr	3.53	3.23	2.09	1960	5	8.91	1983	.68	1985
May	4.41	4.41	2.62	1988	19	8.63	1990	.98	1986
Jun	4.06	4.00	3.92	1972	22	7.83	1972	1.10	1988
Jul	4.49	4.01	5.42	1952	9	13.58	1989	.55	1999
Aug	4.01	3.65	4.75	1971	27	9.90	1971	.69	1983
Sep	4.28	4.40	8.67	1999	16	12.01	1999	1.38	1977
Oct	3.38	2.97	3.58	1966	19	8.50	1976	.50	2000
Nov	3.39	3.23	2.74	1993	28	7.54	1972	.24	1976
Dec	3.56	2.95	3.42	2000	17	8.89	1983	.38	1989
Ann	45.35	45.07	8.67	Sep 1999	16	13.58	Jul 1989	.24	Nov 1976

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	9.2	6.6	2.4	.9
Feb	8.1	5.2	1.9	.6
Mar	9.5	6.9	2.9	1.1
Apr	10.5	7.1	2.5	.8
May	11.4	8.1	3.2	1.0
Jun	9.4	6.8	2.6	1.3
Jul	9.8	6.8	2.7	1.3
Aug	8.7	6.1	2.8	1.3
Sep	8.0	5.7	2.8	1.4
Oct	7.9	5.2	2.4	1.0
Nov	8.7	6.0	2.3	.9
Dec	9.1	6.1	2.3	1.1
Ann	110.3	76.6	30.8	12.7

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	.90	1.22	1.73	2.17	2.61	3.07	3.58	4.19	4.98	6.23	7.40
Feb	.88	1.14	1.52	1.84	2.16	2.49	2.84	3.26	3.80	4.64	5.42
Mar	1.26	1.64	2.21	2.70	3.17	3.66	4.20	4.83	5.65	6.92	8.09
Apr	1.31	1.64	2.12	2.51	2.89	3.27	3.69	4.17	4.79	5.74	6.61
May	1.70	2.11	2.69	3.18	3.64	4.11	4.62	5.21	5.96	7.11	8.16
Jun	1.48	1.87	2.41	2.87	3.31	3.76	4.24	4.81	5.53	6.64	7.66
Jul	.88	1.28	1.94	2.55	3.16	3.82	4.57	5.47	6.66	8.57	10.39
Aug	1.21	1.59	2.16	2.65	3.13	3.62	4.17	4.81	5.64	6.94	8.14
Sep	1.18	1.58	2.20	2.74	3.27	3.82	4.43	5.15	6.09	7.57	8.95
Oct	.82	1.14	1.63	2.07	2.50	2.96	3.48	4.09	4.89	6.16	7.35
Nov	.78	1.09	1.59	2.03	2.48	2.95	3.48	4.11	4.94	6.26	7.50
Dec	.59	.90	1.42	1.91	2.41	2.96	3.59	4.35	5.37	7.02	8.61
Ann	34.52	36.67	39.40	41.44	43.25	44.98	46.76	48.72	51.07	54.46	57.37

\+ 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	4.5	3.0	1	#	13.2	1996	7	16.0	1978	16	1996	12	6	1996	1.8	1.5	.7	.2	.1	5.4	2.7	1.3	.6
Feb	3.8	.5	1	#	15.0	1979	19	25.9	1979	20	1979	19	6	1978	1.3	1.0	.4	.3	.1	4.0	2.6	1.6	.2
Mar	1.6	.0	#	0	14.0	1993	13	14.0	1993	14	1993	13	2	1993	.6	.4	.1	.1	@	1.2	.8	.3	.2
Apr	#	.0	0	0	#	1982	9	#+	1982	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	#	1979	10	#	1979	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Nov	.1	.0	#	0	2.0	1987	11	2.0	1987	5	1989	23	#+	1989	.1	.1	.0	.0	.0	@	.0	.0	.0
Dec	1.0	.0	#	0	6.4	1990	28	6.4	1990	6	1990	28	5	1982	.4	.4	.1	@	.0	.8	.2	.1	.0
Ann	11.0	3.5	N/A	N/A	15.0	Feb 1979	19	25.9	Feb 1979	20	Feb 1979	19	6+	Jan 1996	4.2	3.4	1.3	.6	.2	11.4	6.3	3.3	1.0

+ Also occurred on an earlier date(s) #Denotes trace amounts

(1) Derived from Snow Climatology and 1971-2000 daily data

@ Denotes mean number of days greater than 0 but less than .05

(2) Derived from 1971-2000 daily data

-9/-9.9 represents missing values

Annual statistics for Mean/Median snow depths are not appropriate

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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	5/14	5/10	5/06	5/03	5/01	4/28	4/25	4/21	4/17
32	4/29	4/25	4/22	4/20	4/18	4/16	4/14	4/11	4/07
28	4/20	4/16	4/13	4/10	4/07	4/05	4/02	3/30	3/25
24	4/04	3/30	3/27	3/25	3/23	3/20	3/18	3/15	3/10
20	3/26	3/21	3/17	3/13	3/10	3/07	3/03	2/27	2/22
16	3/17	3/10	3/05	3/01	2/26	2/22	2/18	2/13	2/06

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	9/30	10/04	10/07	10/09	10/12	10/14	10/17	10/20	10/24
32	10/10	10/15	10/18	10/21	10/24	10/27	10/30	11/02	11/07
28	10/20	10/26	10/30	11/02	11/06	11/09	11/13	11/17	11/23
24	11/05	11/10	11/14	11/17	11/20	11/22	11/25	11/29	12/04
20	11/16	11/23	11/28	12/02	12/06	12/09	12/14	12/18	12/25
16	12/04	12/10	12/14	12/18	12/22	12/25	12/29	1/02	1/08

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	184	177	172	168	164	160	155	151	144
32	208	201	196	192	188	185	181	176	169
28	234	226	221	216	212	207	203	197	189
24	260	253	249	245	241	238	234	230	223
20	296	287	281	275	270	265	259	253	244
16	324	315	309	303	298	293	288	282	273

***** 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	1008	834	670	359	111	10	0	0	33	294	560	867	4746
60	853	694	515	221	41	1	0	0	7	175	412	712	3631
57	760	610	424	151	18	0	0	0	2	119	326	619	3029
55	698	555	367	111	9	0	0	0	1	89	273	563	2666
50	555	427	232	42	1	0	0	0	0	36	156	419	1868
32	151	89	11	0	0	0	0	0	0	0	3	75	329

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	166	179	364	633	971	1193	1374	1317	1069	745	433	232	8676
55	0	1	7	54	267	503	661	604	380	121	13	6	2617
57	0	0	2	34	214	443	599	542	321	90	6	0	2251
60	0	0	0	14	144	354	506	449	236	52	2	0	1757
65	0	0	0	2	59	213	351	294	112	16	0	0	1047
70	0	0	0	0	16	99	203	153	32	3	0	0	506

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	36	62	175	410	734	965	1143	1089	849	516	235	74	36	98	273	683	1417	2382	3525	4614	5463	5979	6214	6288
45	15	26	93	273	579	815	988	934	699	365	134	36	15	41	134	407	986	1801	2789	3723	4422	4787	4921	4957
50	2	11	43	154	425	665	833	779	549	229	66	7	2	13	56	210	635	1300	2133	2912	3461	3690	3756	3763
55	0	0	15	74	278	515	678	624	400	121	25	3	0	0	15	89	367	882	1560	2184	2584	2705	2730	2733
60	0	0	4	33	158	367	523	469	260	56	7	0	0	0	4	37	195	562	1085	1554	1814	1870	1877	1877
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	26	40	113	249	458	647	783	749	556	316	136	42	26	66	179	428	886	1533	2316	3065	3621	3937	4073	4115

(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