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: FRANKFORT LOCK 4, KY **COOP ID: 153028**

Climate Division: KY 3 **NWS Call Sign:** **Elevation: 500 Feet** **Lat: 38˚14N** **Lon: 84˚52W**

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	39.8	20.8	30.3	77	1950	26	39.7	1998	-27+	1994	20	14.3	1977	1077	0	.0	.0	7.5	7.8	26.0	2.0
Feb	44.8	23.0	33.9	78	1996	24	41.4	1990	-11	1951	3	20.4	1978	871	0	.0	.0	10.9	5.2	22.4	1.0
Mar	55.3	30.7	43.0	83	1967	14	49.5	1973	-3+	1960	7	37.2	1996	684	0	.0	.0	21.1	.9	18.6	.1
Apr	65.6	39.3	52.5	90	1986	27	57.3	1981	16	1969	1	48.3	1997	377	2	.0	@	27.8	.0	6.6	.0
May	74.6	49.3	62.0	94+	1962	19	67.7	1987	27	1963	1	57.2	1997	166	71	.0	.1	30.9	.0	.2	.0
Jun	82.6	58.7	70.7	103	1954	27	74.2	1971	36	1966	1	64.6	1992	20	189	@	3.8	30.0	.0	.0	.0
Jul	86.9	63.4	75.2	106	1954	15	78.8	1983	49+	1972	7	72.3	1984	0	316	.4	9.8	31.0	.0	.0	.0
Aug	85.8	61.9	73.9	102+	1983	21	79.6	1983	42+	1986	30	70.3	1992	5	279	.1	8.7	31.0	.0	.0	.0
Sep	79.4	54.5	67.0	106	1953	2	72.2	1998	33+	1992	30	61.4	1974	60	118	.0	3.1	30.0	.0	.0	.0
Oct	68.1	42.1	55.1	98	1953	1	62.7	1971	20+	1952	23	49.1	1988	327	19	.0	@	30.4	.0	4.4	.0
Nov	55.4	33.9	44.7	84+	1987	3	52.0	1985	2+	1950	26	36.0	1976	611	0	.0	.0	20.8	.3	14.6	.0
Dec	44.4	25.5	35.0	78	1982	4	42.5	1984	-17	1989	22	22.3	1989	931	0	.0	.0	11.0	4.2	22.8	.6
Ann	65.2	41.9	53.6	106+	Jul 1954	15	79.6	Aug 1983	-27+	Jan 1994	20	14.3	Jan 1977	5129	994	.5	25.5	282.4	18.4	115.6	3.7

\+ 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	3.15	3.49	2.40	1988	20	5.77	1974	.37	1981
Feb	3.08	2.92	2.85	2000	19	7.83	1989	.62	1978
Mar	4.04	3.60	4.55	1997	2	11.92	1997	1.12	1979
Apr	3.67	3.22	3.37	1975	25	8.42	1998	.75	1976
May	4.61	4.41	4.33	1961	8	10.74	1983	1.31	1999
Jun	4.40	4.35	3.96	1960	23	8.63	1998	.44	1988
Jul	4.18	3.83	3.20	1991	9	8.31	1992	.79	1983
Aug	3.58	3.63	2.53	1995	6	8.21	1974	.68	1999
Sep	3.15	2.57	4.33	1965	1	11.45	1979	.75	1999
Oct	2.66	2.38	3.95	1959	8	6.71	1983	.64	1992
Nov	3.33	3.12	3.22	1957	19	7.76	1972	.42	1976
Dec	3.71	3.52	3.45	2000	18	9.29	1990	.92	1976
Ann	43.56	42.31	4.55	Mar 1997	2	11.92	Mar 1997	.37	Jan 1981

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	10.3	5.5	2.1	.8
Feb	9.6	5.5	2.0	.8
Mar	11.5	7.6	2.8	.9
Apr	11.6	7.5	2.4	.7
May	11.5	8.0	3.5	1.3
Jun	10.8	7.8	3.1	1.2
Jul	9.5	6.7	3.1	1.1
Aug	8.1	5.6	2.4	1.0
Sep	8.2	5.2	2.2	.8
Oct	8.3	5.4	1.7	.5
Nov	10.2	6.5	2.3	.6
Dec	11.1	6.5	2.6	.8
Ann	120.7	77.8	30.2	10.5

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	.75	1.05	1.51	1.92	2.32	2.75	3.24	3.81	4.57	5.76	6.88
Feb	.89	1.18	1.62	2.01	2.38	2.77	3.20	3.71	4.36	5.39	6.35
Mar	1.34	1.72	2.29	2.76	3.22	3.70	4.22	4.82	5.60	6.81	7.93
Apr	1.02	1.37	1.89	2.35	2.81	3.28	3.80	4.42	5.22	6.48	7.65
May	1.65	2.08	2.71	3.24	3.74	4.26	4.82	5.48	6.31	7.61	8.79
Jun	1.47	1.89	2.50	3.02	3.52	4.03	4.59	5.25	6.09	7.40	8.60
Jul	1.36	1.75	2.34	2.84	3.32	3.81	4.36	4.99	5.81	7.08	8.26
Aug	1.07	1.41	1.92	2.36	2.79	3.23	3.72	4.30	5.04	6.21	7.29
Sep	.68	.97	1.43	1.85	2.27	2.72	3.22	3.83	4.63	5.90	7.10
Oct	.73	.99	1.37	1.71	2.03	2.38	2.76	3.21	3.79	4.71	5.57
Nov	.94	1.26	1.74	2.16	2.56	2.99	3.46	4.01	4.73	5.86	6.91
Dec	1.16	1.51	2.04	2.49	2.92	3.37	3.86	4.44	5.19	6.35	7.43
Ann	32.79	34.92	37.63	39.67	41.47	43.20	44.98	46.94	49.30	52.70	55.62

\+ 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	.7	.0	#	0
Feb	2.3	1.0	1	0
Mar	.3	#	#	0
Apr	.0	.0	#	0
May	.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	0
Nov	.1	.0	#	0
Dec	.7	.0	#	0
Ann	4.1	1.0	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	9.5	1978	17	9.5	1978	17	1994	19	4	1994
Feb	6.0	1998	6	8.5	1971	15	1998	6	5	1978
Mar	2.5	1980	2	2.5	1980	6	1978	4	1	1978
Apr	.5	1973	10	.5	1973	1+	1987	1	#	1987
May	.0	0	0	.0	0	0	0	0	#	2000
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	.0	0	0	.0	0	0	0	0	0	0
Nov	1.5	1976	29	1.5+	1977	2	1976	29	#	1977
Dec	4.0	1984	6	4.0	1984	4+	1989	24	1	1989
Ann	9.5	Jan 1978	17	9.5	Jan 1978	17	Jan 1994	19	5	Feb 1978

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	.7	.2	.1	.1	.0
Feb	1.9	.9	.3	.1	.0
Mar	.2	.1	.0	.0	.0
Apr	.1	.0	.0	.0	.0
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	.0
Nov	.1	.1	.0	.0	.0
Dec	.6	.3	.1	.0	.0
Ann	3.6	1.6	.5	.2	.0

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	3.7	1.2	.5	.2
Feb	5.2	3.1	1.1	.1
Mar	.8	.2	.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	.0
Nov	.1	.0	.0	.0
Dec	1.2	.6	.0	.0
Ann	11.1	5.1	1.7	.3

+ 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	5/16	5/11	5/08	5/05	5/02	4/29	4/26	4/23	4/18
32	5/03	4/28	4/25	4/22	4/19	4/16	4/13	4/10	4/05
28	4/20	4/16	4/13	4/10	4/07	4/05	4/02	3/30	3/26
24	4/11	4/06	4/02	3/30	3/27	3/24	3/21	3/17	3/11
20	3/30	3/23	3/19	3/15	3/11	3/08	3/04	2/27	2/21
16	3/13	3/07	3/03	2/27	2/24	2/20	2/17	2/12	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	9/25	9/30	10/03	10/07	10/09	10/12	10/16	10/19	10/24
32	10/06	10/11	10/14	10/17	10/20	10/23	10/26	10/29	11/03
28	10/18	10/23	10/27	10/31	11/03	11/06	11/09	11/13	11/18
24	10/31	11/05	11/09	11/12	11/15	11/18	11/21	11/25	11/30
20	11/10	11/15	11/20	11/23	11/27	11/30	12/03	12/08	12/13
16	11/18	11/25	11/29	12/03	12/07	12/11	12/15	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	181	174	168	164	160	155	151	146	138
32	203	196	191	187	183	180	175	171	164
28	230	222	217	213	209	204	200	195	187
24	253	246	241	236	232	228	224	219	212
20	282	274	269	264	260	255	250	245	237
16	310	301	295	290	286	281	276	270	262

***** 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	1077	871	684	377	166	20	0	5	60	327	611	931	5129
60	922	731	529	238	85	4	0	0	19	207	463	776	3974
57	829	647	443	165	51	1	0	0	8	149	380	687	3360
55	776	597	385	124	34	0	0	0	4	116	326	630	2992
50	630	466	254	48	10	0	0	0	1	54	206	487	2156
32	220	121	20	0	0	0	0	0	0	0	10	123	494

Base — Cooling Degree Days (1)

Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	166	175	360	615	928	1159	1339	1297	1049	716	389	215	8408
55	9	6	11	48	249	470	626	584	363	119	15	9	2509
57	0	0	7	30	204	411	564	522	307	89	9	5	2148
60	0	0	0	13	145	324	471	429	228	55	3	0	1668
65	0	0	0	2	71	189	316	279	118	19	0	0	994
70	0	0	0	0	27	86	172	148	46	5	0	0	484

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	41	76	196	405	701	939	1114	1070	833	494	219	81	41	117	313	718	1419	2358	3472	4542	5375	5869	6088	6169
45	19	33	115	272	548	789	959	915	683	352	131	38	19	52	167	439	987	1776	2735	3650	4333	4685	4816	4854
50	5	13	58	167	396	639	804	760	535	220	69	18	5	18	76	243	639	1278	2082	2842	3377	3597	3666	3684
55	0	1	27	87	259	490	649	605	387	121	31	2	0	1	28	115	374	864	1513	2118	2505	2626	2657	2659
60	0	0	8	33	141	344	494	450	252	59	9	0	0	0	8	41	182	526	1020	1470	1722	1781	1790	1790
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	30	56	140	263	450	625	765	725	541	324	141	51	30	86	226	489	939	1564	2329	3054	3595	3919	4060	4111

(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