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: IOLA 1 W, KS **COOP ID: 143984**

Climate Division: KS 9 **NWS Call Sign:** **Elevation: 954 Feet** **Lat: 37˚55N** **Lon: 95˚26W**

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	18.8	29.3	72	1964	22	39.5	1990	-16	1979	8	16.0	1979	1108	0	.0	.0	8.7	8.1	26.6	1.7
Feb	46.8	23.7	35.3	84	1962	12	46.0	1976	-19	1979	1	23.1	1978	833	0	.0	.0	12.7	4.3	20.1	1.0
Mar	57.2	33.0	45.1	88	1995	22	49.6	1986	-1	1960	6	39.2	1984	617	0	.0	.0	23.7	.5	12.1	.0
Apr	67.4	43.5	55.5	95	1972	12	62.9	1981	19	1975	3	48.0	1983	301	14	.0	.2	28.7	.0	2.3	.0
May	76.4	55.0	65.7	96	1964	26	70.4	1987	28	1963	1	60.7	1997	85	107	.0	.4	31.0	.0	@	.0
Jun	84.9	64.3	74.6	106	1980	27	79.1	1980	45	1998	6	70.3	1992	5	293	.2	8.2	30.0	.0	.0	.0
Jul	90.5	69.1	79.8	109	1980	12	88.3	1980	50	1971	31	76.5	1971	0	459	2.2	18.4	31.0	.0	.0	.0
Aug	88.8	66.3	77.6	107	1980	1	83.9	1983	46	1988	29	71.1	1992	4	392	1.3	16.5	31.0	.0	.0	.0
Sep	81.2	57.8	69.5	105+	2000	4	75.2	1978	30	1984	30	62.2	1974	44	179	.2	5.6	30.0	.0	.1	.0
Oct	70.8	46.6	58.7	96+	1963	7	62.9	1971	18	1993	31	52.9	1976	216	20	.0	.4	30.2	.0	1.7	.0
Nov	55.3	33.7	44.5	83+	1989	11	53.0	1999	3	1975	27	38.1	1976	615	0	.0	.0	21.1	.6	11.8	.0
Dec	43.3	23.5	33.4	75	1966	7	40.4	1982	-19	1989	23	18.0	1983	979	0	.0	.0	10.6	4.5	23.4	.8
Ann	66.9	44.6	55.8	109	Jul 1980	12	88.3	Jul 1980	-19+	Dec 1989	23	16.0	Jan 1979	4807	1464	3.9	49.7	288.7	18.0	98.1	3.5

+ 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: 1948-2001

(3) Derived from 1971-2000 serially complete daily data

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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	1.36	1.01	2.38	1971	3	4.09	1973	.00	1986
Feb	1.54	1.37	4.00	1997	21	5.07	1997	.00	1996
Mar	3.26	2.93	2.51	1985	4	10.42	1973	.37	1971
Apr	3.69	3.36	5.75	1994	28	13.52	1994	.18	1989
May	5.18	4.21	4.84	1990	26	13.58	1982	.89	1998
Jun	5.29	5.30	3.95	1985	4	10.66	1979	.91	1988
Jul	4.57	3.55	4.98	1992	5	17.61	1992	.04	1974
Aug	4.00	3.39	5.70	1985	22	10.28	1974	.00	2000
Sep	4.34	4.59	5.20	1981	1	12.72	1973	.05	1979
Oct	3.77	3.56	5.55	1986	3	13.00	1986	.37	1995
Nov	3.11	2.88	3.98	1979	21	10.26	1992	.00	1989
Dec	1.73	1.47	2.38	1975	15	5.41	1992	.00	1996
Ann	41.84	41.17	5.75	Apr 1994	28	17.61	Jul 1992	.00+	Aug 2000

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	5.7	3.2	.7	.3
Feb	5.3	3.3	.9	.3
Mar	8.2	5.9	2.6	.8
Apr	9.4	6.3	2.3	1.0
May	10.3	7.3	3.6	1.4
Jun	9.6	7.0	3.4	1.8
Jul	7.7	5.9	3.1	1.7
Aug	7.4	5.3	2.6	1.4
Sep	7.9	5.8	2.7	1.3
Oct	7.5	5.4	2.3	1.3
Nov	7.3	4.7	2.0	.8
Dec	5.5	3.4	1.3	.3
Ann	91.8	63.5	27.5	12.4

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	.09	.22	.44	.64	.85	1.08	1.34	1.67	2.12	2.85	3.55
Feb	.10	.25	.50	.72	.96	1.22	1.53	1.90	2.41	3.24	4.04
Mar	.74	1.04	1.51	1.94	2.37	2.83	3.34	3.95	4.76	6.04	7.25
Apr	.66	.98	1.52	2.02	2.54	3.09	3.73	4.50	5.52	7.17	8.74
May	1.02	1.48	2.24	2.94	3.65	4.41	5.27	6.30	7.67	9.87	11.96
Jun	1.56	2.06	2.82	3.47	4.11	4.77	5.50	6.36	7.47	9.21	10.82
Jul	.47	.80	1.43	2.06	2.75	3.52	4.44	5.57	7.12	9.70	12.22
Aug	.34	.78	1.43	2.02	2.62	3.28	4.03	4.94	6.16	8.14	10.04
Sep	.40	.71	1.30	1.90	2.56	3.30	4.19	5.29	6.81	9.35	11.83
Oct	.81	1.15	1.71	2.21	2.71	3.25	3.85	4.58	5.53	7.06	8.50
Nov	.38	.77	1.29	1.73	2.18	2.66	3.19	3.84	4.68	6.04	7.32
Dec	.08	.23	.49	.74	1.02	1.32	1.68	2.13	2.74	3.76	4.76
Ann	27.23	29.96	33.51	36.24	38.69	41.07	43.56	46.32	49.70	54.65	58.97

\+ 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	2.8	1.3	1	#
Feb	2.2	1.5	1	#
Mar	.6	.0	#	0
Apr	.0	.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	.8	.0	#	0
Dec	.9	.0	#	0
Ann	7.3	2.8	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	8.0	1993	10	11.7	1987	8	1987	11	5	1979
Feb	6.0	1971	22	7.8	1982	12	1980	8	10	1980
Mar	4.0	1988	17	4.8	1998	5	1988	18	#+	1998
Apr	.0	0	0	.0	0	0	0	0	0	0
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	.0	0	0	.0	0	0	0	0	0	0
Nov	10.0	1975	26	10.0	1975	10	1975	26	#+	1995
Dec	7.5	1973	31	7.5	1973	11	2000	13	3	2000
Ann	10.0	Nov 1975	26	11.7	Jan 1987	12	Feb 1980	8	10	Feb 1980

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	2.0	1.4	.7	.1	.0
Feb	1.2	1.0	.3	.2	.0
Mar	.5	.5	.1	.0	.0
Apr	.0	.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	.2	.2	.1	@	@
Dec	.9	.7	.2	.1	.0
Ann	4.8	3.8	1.4	.4	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	1.9	1.2	.0	.0
Feb	.9	.2	.0	.0
Mar	.4	.1	.0	.0
Apr	.0	.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	.3	.1	.1	.1
Dec	1.0	.5	.4	.0
Ann	4.5	2.1	.5	.1

+ 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	5/05	5/01	4/28	4/25	4/22	4/20	4/17	4/14	4/09
32	4/20	4/16	4/13	4/11	4/08	4/06	4/03	3/31	3/27
28	4/14	4/09	4/06	4/03	3/31	3/28	3/25	3/21	3/17
24	4/03	3/28	3/24	3/20	3/17	3/13	3/09	3/05	2/27
20	3/23	3/16	3/11	3/06	3/02	2/26	2/22	2/17	2/09
16	3/16	3/09	3/03	2/27	2/22	2/18	2/13	2/07	1/31

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	9/27	10/02	10/05	10/08	10/11	10/14	10/17	10/21	10/25
32	10/06	10/12	10/16	10/20	10/23	10/27	10/31	11/04	11/10
28	10/18	10/24	10/28	11/01	11/05	11/08	11/12	11/16	11/22
24	10/28	11/04	11/09	11/14	11/18	11/22	11/26	12/02	12/09
20	11/08	11/15	11/20	11/24	11/28	12/02	12/06	12/11	12/18
16	11/17	11/24	11/29	12/04	12/08	12/12	12/17	12/22	12/29

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	191	184	179	175	171	167	163	158	151
32	218	211	206	202	197	193	189	184	177
28	242	233	228	223	218	213	208	203	194
24	271	262	256	251	246	241	235	229	220
20	302	291	283	276	270	263	257	249	237
16	322	311	302	295	288	281	274	266	254

***** 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	1108	833	617	301	85	5	0	4	44	216	615	979	4807
60	953	699	463	183	32	0	0	0	13	108	471	824	3746
57	860	621	376	125	15	0	0	0	5	63	388	735	3188
55	799	568	319	93	8	0	0	0	2	42	336	677	2844
50	655	444	195	37	1	0	0	0	0	11	222	535	2100
32	223	128	10	0	0	0	0	0	0	0	20	153	534

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	138	219	416	703	1045	1278	1482	1411	1125	827	395	197	9236
55	2	15	12	107	340	588	769	698	437	156	21	8	3153
57	1	12	7	79	284	528	707	636	379	115	14	4	2766
60	0	6	1	46	208	438	614	543	297	67	6	0	2226
65	0	0	0	14	107	293	459	392	179	20	0	0	1464
70	0	0	0	3	41	166	310	252	92	4	0	0	868

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	42	108	282	527	826	1063	1253	1197	917	615	237	64	42	150	432	959	1785	2848	4101	5298	6215	6830	7067	7131
45	11	54	176	388	671	913	1098	1042	767	463	143	27	11	65	241	629	1300	2213	3311	4353	5120	5583	5726	5753
50	2	21	97	257	517	763	943	887	617	324	76	7	2	23	120	377	894	1657	2600	3487	4104	4428	4504	4511
55	0	7	43	152	365	613	788	732	471	202	30	1	0	7	50	202	567	1180	1968	2700	3171	3373	3403	3404
60	0	1	14	77	228	464	633	577	335	107	11	0	0	1	15	92	320	784	1417	1994	2329	2436	2447	2447
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	33	79	179	329	532	731	857	814	609	384	139	44	33	112	291	620	1152	1883	2740	3554	4163	4547	4686	4730

(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:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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