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: HOLTON, KS **COOP ID: 143759**

Climate Division: KS 3 **NWS Call Sign:** **Elevation: 1,043 Feet** **Lat: 39˚28N** **Lon: 95˚44W**

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	36.0	14.8	25.4	71+	1989	31	36.5	1990	-21	1974	12	12.6	1979	1228	0	.0	.0	6.1	10.8	28.1	3.9
Feb	42.8	19.8	31.3	81	1972	29	41.9	1976	-22	1979	1	16.0	1978	944	0	.0	.0	10.5	6.7	22.6	2.2
Mar	53.7	29.5	41.6	88	1986	29	48.8	1986	-21	1978	4	33.7	1978	724	0	.0	.0	20.5	1.4	16.4	.3
Apr	64.5	40.6	52.6	93+	1989	27	61.3	1981	5	1975	3	45.9	1983	379	6	.0	.3	27.8	@	5.2	.0
May	74.6	52.2	63.4	97+	2000	12	68.7	1998	22	1976	3	58.5	1995	126	77	.0	.6	31.0	.0	.3	.0
Jun	83.7	62.0	72.9	109	1980	27	76.8	1980	40+	1983	1	68.1	1992	11	247	.4	7.5	30.0	.0	.0	.0
Jul	88.9	67.1	78.0	110	1980	14	86.5	1980	43	1972	5	73.8	1971	0	403	2.1	16.6	31.0	.0	.0	.0
Aug	87.5	64.6	76.1	110	1984	29	83.0	1983	42	1956	21	69.8	1992	8	350	1.8	14.6	31.0	.0	.0	.0
Sep	79.7	55.5	67.6	109	2000	3	73.5	1978	29+	1984	29	61.5	1993	70	148	.3	5.3	29.9	.0	.3	.0
Oct	68.1	43.5	55.8	97	1963	5	61.5	1971	14	1993	31	50.5	1976	294	9	.0	.2	29.7	.0	4.2	.0
Nov	52.2	30.7	41.5	85	1999	13	50.1	1999	-7	1976	28	35.1	1991	706	0	.0	.0	18.4	1.3	16.3	.1
Dec	39.7	19.8	29.8	71+	2001	6	35.6	1979	-23+	1989	23	12.8	1983	1093	0	.0	.0	7.9	7.0	27.4	2.1
Ann	64.3	41.7	53.0	110+	Aug 1984	29	86.5	Jul 1980	-23+	Dec 1989	23	12.6	Jan 1979	5583	1240	4.6	45.1	273.8	27.2	120.8	8.6

\+ 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	.97	1.12	1.81	1965	2	2.17	1996	.00	1986
Feb	1.11	1.05	2.17	1997	21	3.23	1997	.03	1991
Mar	2.49	2.12	2.37	1980	30	6.66	1973	.20	1997
Apr	3.43	3.40	2.97	1991	27	9.26	1999	.50	1989
May	4.75	4.00	3.31	1996	27	12.20	1995	1.15	1992
Jun	4.97	4.12	5.55	1982	9	13.05	1984	1.30	1997
Jul	4.30	3.75	6.23	1968	16	15.49	1993	.70	1975
Aug	4.15	3.75	4.96	1960	18	10.51	1985	.51	1984
Sep	4.42	3.42	6.15	1978	20	13.43	1977	.56	1979
Oct	3.25	2.86	8.37	1973	11	9.25	1973	.34	1995
Nov	2.38	2.15	2.91	1977	9	6.44	1998	.00	1989
Dec	1.37	.94	4.25	1980	8	5.35	1980	.02	1979
Ann	37.59	38.61	8.37	Oct 1973	11	15.49	Jul 1993	.00+	Nov 1989

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	5.4	3.0	.5	.1
Feb	5.1	3.1	.6	.1
Mar	6.8	4.9	1.8	.6
Apr	9.0	6.3	2.3	.8
May	10.7	7.4	3.3	1.5
Jun	9.8	6.8	3.2	1.7
Jul	8.7	6.2	2.7	1.5
Aug	8.1	5.5	2.5	1.2
Sep	7.6	5.2	2.5	1.5
Oct	7.1	5.1	1.9	.9
Nov	6.2	3.8	1.9	.5
Dec	4.9	2.9	.7	.2
Ann	89.4	60.2	23.9	10.6

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	.07	.17	.32	.46	.61	.78	.97	1.20	1.51	2.03	2.53
Feb	.16	.25	.41	.56	.72	.90	1.10	1.35	1.69	2.25	2.78
Mar	.40	.61	.97	1.32	1.67	2.06	2.50	3.04	3.76	4.93	6.06
Apr	.96	1.29	1.78	2.21	2.63	3.07	3.55	4.13	4.87	6.04	7.13
May	1.35	1.80	2.48	3.07	3.65	4.25	4.92	5.71	6.73	8.34	9.83
Jun	1.51	1.98	2.69	3.29	3.88	4.49	5.16	5.95	6.97	8.57	10.04
Jul	.79	1.17	1.80	2.39	2.98	3.63	4.36	5.25	6.42	8.32	10.12
Aug	.64	.99	1.59	2.16	2.76	3.41	4.16	5.07	6.30	8.30	10.21
Sep	.55	.90	1.52	2.14	2.79	3.51	4.36	5.40	6.81	9.13	11.39
Oct	.43	.69	1.15	1.60	2.08	2.61	3.22	3.97	4.99	6.66	8.28
Nov	.09	.27	.61	.96	1.34	1.76	2.27	2.91	3.80	5.27	6.72
Dec	.09	.18	.35	.54	.75	.99	1.28	1.65	2.17	3.05	3.92
Ann	23.45	26.05	29.46	32.09	34.46	36.79	39.21	41.92	45.24	50.13	54.42

\+ 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

Complete documentation available from:
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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	6.1	5.0	1	1
Feb	4.5	4.0	1	#
Mar	2.9	.9	#	#
Apr	.4	.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	.2	.0	#	0
Nov	1.2	.0	#	0
Dec	3.2	2.0	1	#
Ann	18.5	11.9	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	1979	13	24.0	1979	9	1993	11	6	1985
Feb	8.0	1978	13	16.4	1978	12	1983	4	4	1983
Mar	9.0	1975	10	12.1	1998	11	1998	11	3	1998
Apr	4.0	1975	2	5.0	1975	1	1997	12	#+	1997
May	#	1994	1	#	1994	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	4.9	1996	23	4.9	1996	5	1996	23	#+	1996
Nov	7.0	1975	26	8.0	1975	4	1991	23	1	1991
Dec	6.6	1999	5	12.0	1973	11	1983	26	5	1983
Ann	9.0	Mar 1975	10	24.0	Jan 1979	12	Feb 1983	4	6	Jan 1985

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	3.2	2.4	.7	.2	.0
Feb	2.1	1.6	.8	.1	.0
Mar	.9	.7	.3	.2	.0
Apr	.2	.1	@	.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	.1	@	@	.0	.0
Nov	.6	.4	.2	@	.0
Dec	1.9	1.3	.5	.1	.0
Ann	9.0	6.5	2.5	.6	.0

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	5.8	2.3	.9	.0
Feb	3.2	2.0	.5	.0
Mar	1.5	.7	.4	.2
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	.1	.1	.1	.0
Nov	.6	.1	.0	.0
Dec	3.1	1.6	.8	.0
Ann	14.4	6.8	2.7	.2

+ 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	5/16	5/11	5/07	5/04	5/01	4/28	4/25	4/21	4/16
32	5/05	5/01	4/27	4/24	4/22	4/19	4/16	4/12	4/08
28	4/20	4/15	4/12	4/09	4/07	4/04	4/01	3/29	3/24
24	4/14	4/08	4/04	3/31	3/28	3/24	3/21	3/16	3/10
20	4/05	3/30	3/26	3/22	3/18	3/15	3/11	3/07	3/01
16	3/30	3/22	3/16	3/11	3/06	3/01	2/24	2/18	2/09

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	9/16	9/21	9/25	9/28	10/01	10/04	10/07	10/11	10/16
32	9/23	9/29	10/03	10/06	10/09	10/12	10/16	10/20	10/25
28	10/09	10/15	10/20	10/23	10/27	10/30	11/03	11/07	11/13
24	10/15	10/21	10/26	10/30	11/02	11/06	11/10	11/14	11/21
20	10/25	11/02	11/07	11/11	11/16	11/20	11/24	11/30	12/07
16	10/31	11/07	11/13	11/17	11/22	11/26	12/01	12/06	12/14

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	173	166	161	156	152	148	144	139	132
32	191	184	178	174	170	166	162	156	149
28	227	219	212	207	202	197	192	186	177
24	248	238	231	225	219	213	207	200	191
20	271	261	254	247	242	236	229	222	212
16	298	285	276	268	260	253	245	235	223

***** 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	1228	944	724	379	126	11	0	8	70	294	706	1093	5583
60	1073	810	572	247	56	2	0	1	25	168	559	938	4451
57	981	732	486	180	30	0	0	0	11	108	476	845	3849
55	921	679	429	141	18	0	0	0	6	77	421	784	3476
50	776	553	298	67	4	0	0	0	0	28	295	640	2661
32	318	206	40	0	0	0	0	0	0	0	40	212	816

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	113	186	338	617	974	1225	1426	1365	1068	738	324	143	8517
55	3	15	15	68	279	535	713	652	384	102	14	2	2782
57	1	12	10	47	229	475	651	590	329	71	9	0	2424
60	0	6	3	24	162	387	558	498	252	38	3	0	1931
65	0	0	0	6	77	247	403	350	148	9	0	0	1240
70	0	0	0	0	27	131	257	218	74	1	0	0	708

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	25	76	216	450	758	1010	1195	1144	854	532	169	34	25	101	317	767	1525	2535	3730	4874	5728	6260	6429	6463
45	6	33	128	315	603	860	1040	989	704	387	91	10	6	39	167	482	1085	1945	2985	3974	4678	5065	5156	5166
50	0	10	69	199	449	710	885	834	554	256	44	5	0	10	79	278	727	1437	2322	3156	3710	3966	4010	4015
55	0	2	31	112	301	560	730	679	413	150	14	0	0	2	33	145	446	1006	1736	2415	2828	2978	2992	2992
60	0	0	8	56	179	412	575	524	283	70	3	0	0	0	8	64	243	655	1230	1754	2037	2107	2110	2110
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	21	62	151	279	478	682	807	764	560	335	106	30	21	83	234	513	991	1673	2480	3244	3804	4139	4245	4275

(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