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: RUSSELL 1 E, KS **COOP ID: 147046**

Climate Division: KS 5 **NWS Call Sign: RSL** **Elevation: 1,858 Feet** **Lat: 38˚53N** **Lon: 98˚49W**

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	39.5	16.0	27.8	84	1989	31	37.4	1992	-20	1959	4	12.8	1979	1154	0	.0	.0	7.0	8.8	30.0	2.3
Feb	46.0	21.0	33.5	85+	1972	29	42.2	1976	-20	1951	1	20.0	1978	882	0	.0	.0	10.5	5.9	24.4	1.9
Mar	55.9	30.2	43.1	91	1971	31	49.8	1986	-16	1960	3	35.8	1975	682	0	.0	.1	20.7	1.4	17.4	.1
Apr	66.1	40.2	53.2	101+	1989	24	61.1	1981	14	1994	6	45.5	1983	364	10	.1	.5	27.3	.1	4.8	.0
May	75.0	51.1	63.1	102	1956	20	68.3	1977	25	1966	13	57.1	1995	138	78	.0	1.4	30.8	.0	.2	.0
Jun	86.9	61.2	74.1	114	1980	30	79.7	1988	39	1954	4	67.9	1982	15	285	1.7	10.7	30.0	.0	.0	.0
Jul	92.5	66.6	79.6	111+	1980	14	87.1	1980	45	1952	8	75.4	1992	0	451	5.1	21.2	31.0	.0	.0	.0
Aug	90.0	65.0	77.5	109+	1983	15	84.6	1983	45	1967	27	71.4	1992	5	393	3.1	17.5	31.0	.0	.0	.0
Sep	81.2	55.6	68.4	108	1956	12	74.8	1998	28	1995	22	62.0	1974	53	154	.6	6.6	29.7	.0	.2	.0
Oct	69.3	43.0	56.2	96+	1991	8	59.5	1975	13	1993	31	49.9	1976	283	9	.0	.8	29.5	.1	3.2	.0
Nov	53.2	29.1	41.2	86	1980	6	49.4	1999	-5	1958	28	32.8	1985	716	0	.0	.0	18.6	1.7	19.4	.1
Dec	42.6	19.7	31.2	75	1950	25	36.9	1991	-24	1989	22	14.1	1983	1049	0	.0	.0	8.1	5.8	29.2	1.3
Ann	66.5	41.6	54.1	114	Jun 1980	30	87.1	Jul 1980	-24	Dec 1989	22	12.8	Jan 1979	5341	1380	10.6	58.8	274.2	23.8	128.8	5.7

\+ 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: 1949-2001

(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	.68	.60	1.02	1971	3	1.92	1979	.00	1986
Feb	.78	.47	1.11	1993	10	2.77	1971	.01	1991
Mar	2.32	1.65	2.75	1987	23	9.29	1973	.00	1997
Apr	2.87	2.61	3.04	1976	15	7.88	1985	.18	1989
May	4.02	3.36	4.70	1991	29	10.84	1991	1.08	1986
Jun	2.99	2.54	3.55	1966	7	9.45	1989	.46	1988
Jul	3.60	2.66	3.72	1993	1	11.49	1993	.18	1975
Aug	3.34	3.22	5.15	1969	31	7.48	1977	.50	1994
Sep	1.95	1.47	5.73	1967	17	7.79	1973	.12	1991
Oct	1.52	1.24	3.07	1979	30	4.01	1984	.20	1999
Nov	1.32	1.08	2.17	1981	1	4.57	1981	.00+	1989
Dec	.86	.68	1.76	1984	15	3.20	1984	.00	1976
Ann	26.25	25.86	5.73	Sep 1967	17	11.49	Jul 1993	.00+	Mar 1997

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	4.3	1.7	.3	.1
Feb	4.7	1.9	.3	@
Mar	7.1	4.0	1.5	.6
Apr	7.4	4.4	1.8	.7
May	9.6	6.5	2.4	.9
Jun	7.4	4.9	1.7	.8
Jul	7.7	4.9	2.1	1.0
Aug	7.3	5.0	2.1	.6
Sep	5.7	3.3	1.1	.4
Oct	5.4	2.8	.7	.3
Nov	4.5	2.3	.6	.1
Dec	4.0	1.9	.4	.1
Ann	75.1	43.6	15.0	5.6

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	.08	.16	.28	.38	.47	.58	.70	.84	1.03	1.33	1.62
Feb	.03	.07	.15	.25	.37	.51	.69	.93	1.26	1.84	2.43
Mar	.11	.32	.67	1.01	1.37	1.78	2.26	2.86	3.68	5.03	6.35
Apr	.74	1.01	1.42	1.79	2.16	2.54	2.96	3.47	4.13	5.17	6.14
May	1.01	1.39	1.97	2.49	3.00	3.54	4.14	4.85	5.79	7.26	8.64
Jun	.66	.93	1.37	1.77	2.17	2.59	3.06	3.63	4.38	5.58	6.71
Jul	.47	.77	1.28	1.78	2.31	2.89	3.57	4.40	5.52	7.37	9.15
Aug	.72	1.03	1.52	1.96	2.41	2.88	3.42	4.06	4.91	6.26	7.54
Sep	.24	.39	.66	.94	1.22	1.55	1.92	2.38	3.01	4.04	5.04
Oct	.18	.30	.51	.73	.95	1.20	1.50	1.86	2.36	3.17	3.96
Nov	.00	.10	.32	.52	.74	.99	1.28	1.63	2.12	2.94	3.74
Dec	.02	.07	.18	.31	.44	.60	.79	1.04	1.39	1.97	2.55
Ann	16.42	18.23	20.60	22.43	24.08	25.70	27.38	29.27	31.58	34.97	37.95

\+ 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: 1949-2001
(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	6.2	4.8	2	1
Feb	5.2	3.4	1	1
Mar	5.2	4.7	#	1
Apr	1.2	.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	.4	.0	#	0
Nov	2.4	1.2	#	0
Dec	4.7	3.5	#	0
Ann	25.3	17.6	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	11.0	1985	9	20.7	1979	17	1979	30	7	1979
Feb	11.8	1980	7	19.8	1971	16	1979	1	6	1979
Mar	12.0	1980	23	19.1	1980	11	1987	29	2+	1975
Apr	4.9	1994	5	5.4	1973	5	1994	6	#	1994
May	.0	0	0	.0	0	0	0	0	#	1995
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	.6	1995	21	.6	1995	#	1995	21	0	0
Oct	4.4	1991	31	4.6	1976	1+	1991	31	#	1991
Nov	5.9	1992	24	8.2	1992	8+	1992	27	1+	1992
Dec	11.0	1979	28	17.6	1973	12	1973	31	3	1983
Ann	12.0	Mar 1980	23	20.7	Jan 1979	17	Jan 1979	30	7	Jan 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	3.5	2.1	.5	.3	@
Feb	2.5	1.5	.6	.3	@
Mar	2.1	1.4	.6	.3	.1
Apr	.6	.4	.2	.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	.2	.2	.1	.0	.0
Nov	1.4	1.0	.2	@	.0
Dec	2.3	1.5	.5	.2	@
Ann	12.6	8.1	2.7	1.1	.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	10.6	6.4	4.4	1.5
Feb	7.4	5.2	3.5	1.4
Mar	3.0	1.5	.9	.1
Apr	.6	.2	@	.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	.0	.0	.0
Nov	1.8	.7	.4	.0
Dec	5.7	2.0	.7	@
Ann	29.2	16.0	9.9	3.0

+ 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	5/13	5/07	5/03	4/30	4/27	4/24	4/21	4/17	4/12
32	5/07	5/01	4/27	4/23	4/20	4/17	4/13	4/09	4/03
28	4/18	4/14	4/10	4/07	4/04	4/01	3/29	3/25	3/21
24	4/10	4/05	4/02	3/30	3/27	3/24	3/21	3/18	3/13
20	4/05	3/29	3/24	3/20	3/17	3/13	3/09	3/04	2/25
16	3/26	3/19	3/14	3/09	3/05	3/01	2/24	2/19	2/11

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	9/19	9/25	9/29	10/03	10/06	10/10	10/13	10/17	10/23
32	9/28	10/04	10/08	10/12	10/15	10/18	10/22	10/26	11/01
28	10/09	10/15	10/19	10/23	10/27	10/30	11/03	11/07	11/14
24	10/19	10/25	10/30	11/03	11/07	11/10	11/14	11/19	11/25
20	11/02	11/07	11/11	11/14	11/17	11/19	11/22	11/26	12/01
16	11/06	11/14	11/20	11/24	11/29	12/04	12/08	12/14	12/22

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	189	179	173	167	161	156	150	143	133
32	204	195	188	183	177	172	166	160	151
28	233	223	216	210	205	199	193	187	177
24	251	241	235	229	224	219	213	206	197
20	269	261	254	249	244	239	234	228	220
16	304	292	283	275	269	262	254	245	233

***** 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	1154	882	682	364	138	15	0	5	53	283	716	1049	5341
60	999	750	528	237	65	3	0	0	16	159	567	894	4218
57	907	671	441	173	36	1	0	0	6	101	482	801	3619
55	847	619	384	136	23	0	0	0	2	71	427	740	3249
50	702	494	254	65	6	0	0	0	0	25	297	596	2439
32	257	166	22	0	0	0	0	0	0	0	36	179	660

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	126	208	364	635	962	1260	1474	1411	1091	749	310	153	8743
55	2	17	12	82	273	570	761	698	403	107	10	1	2936
57	1	13	8	58	224	511	699	636	347	74	5	0	2576
60	0	8	1	32	160	424	606	543	267	39	1	0	2081
65	0	0	0	10	78	285	451	393	154	9	0	0	1380
70	0	0	0	2	29	168	301	255	75	1	0	0	831

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	17	68	193	418	724	1033	1240	1183	857	515	144	25	17	85	278	696	1420	2453	3693	4876	5733	6248	6392	6417
45	2	31	108	287	570	883	1085	1028	708	374	72	5	2	33	141	428	998	1881	2966	3994	4702	5076	5148	5153
50	0	9	56	170	419	733	930	873	560	242	37	0	0	9	65	235	654	1387	2317	3190	3750	3992	4029	4029
55	0	2	23	90	275	583	775	718	418	141	11	0	0	2	25	115	390	973	1748	2466	2884	3025	3036	3036
60	0	0	7	42	153	436	620	563	291	69	1	0	0	0	7	49	202	638	1258	1821	2112	2181	2182	2182
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	27	63	144	259	445	684	822	785	551	321	108	32	27	90	234	493	938	1622	2444	3229	3780	4101	4209	4241

(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