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: CASSODAY, KS **COOP ID: 141351**

Climate Division: KS 9 **NWS Call Sign:** **Elevation: 1,460 Feet** **Lat: 38˚03N** **Lon: 96˚38W**

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	38.5	14.9	26.7	75	1981	24	36.4	1990	-20	1985	20	11.8	1979	1187	0	.0	.0	8.3	8.8	28.9	2.6
Feb	45.3	20.0	32.7	81	1972	29	43.4	1976	-18	1982	6	19.6	1979	906	0	.0	.0	12.1	5.4	22.8	1.5
Mar	55.4	29.3	42.4	87+	1967	29	49.1	1986	-4+	1980	2	36.0	1996	703	0	.0	.0	22.4	.9	16.1	.1
Apr	65.6	40.8	53.2	94	1972	12	60.1	1981	13	1975	3	45.5	1983	363	8	.0	.3	28.5	.0	4.7	.0
May	74.2	52.2	63.2	99	1964	26	68.2	1977	26	1967	2	57.2	1995	131	75	.0	.7	31.0	.0	.1	.0
Jun	83.5	61.8	72.7	109+	1980	30	77.8	1980	42+	1998	7	67.1	1992	14	244	.3	7.6	30.0	.0	.0	.0
Jul	89.8	66.9	78.4	110+	1980	17	88.2	1980	46	1970	21	74.6	1971	0	414	3.0	17.9	31.0	.0	.0	.0
Aug	88.6	64.5	76.6	109	1980	1	84.1	2000	42	1964	12	69.5	1992	9	367	2.7	17.0	31.0	.0	.0	.0
Sep	80.4	55.8	68.1	106	2000	3	75.3	1998	27	1984	30	60.2	1974	60	153	.7	6.8	30.0	.0	.2	.0
Oct	69.0	43.3	56.2	94+	1976	1	60.0	2000	15	1993	31	50.8	1976	285	10	.0	.4	29.9	.0	3.4	.0
Nov	53.9	30.1	42.0	84	1980	8	51.7	1999	-4	1975	27	35.1	1991	691	0	.0	.0	20.4	.9	15.5	.1
Dec	41.8	19.7	30.8	74+	1975	5	36.6	1991	-22	1989	22	14.6	1983	1062	0	.0	.0	9.7	5.4	27.2	1.3
Ann	65.5	41.6	53.6	110+	Jul 1980	17	88.2	Jul 1980	-22	Dec 1989	22	11.8	Jan 1979	5411	1271	6.7	50.7	284.3	21.4	118.9	5.6

\+ 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	.80	.48	1.87	1949	3	3.18	1979	.00	1986
Feb	1.03	.94	2.10	1997	21	2.84	1997	.00	1991
Mar	2.44	2.34	1.94	1980	30	8.03	1973	.11	1971
Apr	3.21	2.48	2.90	1976	28	10.39	1999	.15	1989
May	4.37	3.53	3.45	1964	28	9.52	1977	.34	1994
Jun	4.89	4.67	8.20	1979	8	13.96	1979	1.11	1980
Jul	3.51	3.20	3.40	1976	3	9.31	1992	.09	1974
Aug	3.46	2.40	4.45	1986	27	11.98	1989	.24	1984
Sep	3.21	2.95	4.14	2001	18	10.29	1973	.63	1979
Oct	2.50	2.03	3.85	1973	11	5.99	2000	.20	1991
Nov	2.26	2.13	5.05	1998	1	9.20	1998	.00+	1995
Dec	1.11	.60	2.00	1999	9	3.87	1984	.00	1975
Ann	32.79	32.35	8.20	Jun 1979	8	13.96	Jun 1979	.00+	Nov 1995

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	3.3	2.2	.5	.1
Feb	3.8	2.5	.6	.1
Mar	5.7	4.6	1.6	.6
Apr	7.1	5.3	2.3	.9
May	8.4	7.0	3.5	1.4
Jun	7.3	6.0	3.4	1.6
Jul	5.7	4.9	2.6	1.3
Aug	5.5	4.4	2.4	1.1
Sep	6.2	5.1	2.4	1.1
Oct	5.0	4.2	1.9	.7
Nov	4.7	3.7	1.4	.6
Dec	3.7	2.5	.9	.3
Ann	66.4	52.4	23.5	9.8

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	.02	.07	.18	.29	.42	.57	.74	.97	1.29	1.84	2.38
Feb	.02	.09	.22	.37	.53	.72	.96	1.26	1.67	2.38	3.08
Mar	.35	.55	.90	1.24	1.59	1.98	2.43	2.98	3.72	4.92	6.08
Apr	.41	.67	1.13	1.58	2.05	2.57	3.18	3.93	4.94	6.60	8.21
May	1.20	1.62	2.25	2.80	3.34	3.90	4.53	5.26	6.23	7.74	9.14
Jun	1.33	1.79	2.50	3.12	3.72	4.35	5.06	5.89	6.97	8.67	10.25
Jul	.23	.45	.89	1.37	1.91	2.53	3.29	4.26	5.60	7.87	10.13
Aug	.33	.58	1.05	1.53	2.05	2.64	3.34	4.22	5.41	7.41	9.36
Sep	.59	.88	1.35	1.78	2.23	2.71	3.25	3.91	4.78	6.19	7.53
Oct	.41	.63	.99	1.34	1.69	2.08	2.52	3.06	3.77	4.94	6.05
Nov	.00	.00	.85	1.26	1.61	1.99	2.40	2.89	3.49	4.48	5.41
Dec	.03	.11	.27	.43	.60	.80	1.05	1.36	1.78	2.50	3.21
Ann	21.32	23.46	26.25	28.40	30.32	32.20	34.15	36.32	38.98	42.87	46.27

+ 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	4.6	2.3	#	0
Feb	2.1	.1	#	0
Mar	1.1	.0	0	0
Apr	.4	.0	#	0
May	.0	.0	0	0
Jun	.0	.0	#	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.0	.0	0	0
Oct	#	.0	0	0
Nov	1.2	.0	#	0
Dec	2.1	1.4	#	#
Ann	11.5	3.8	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	1979	1	24.6	1979	9	1987	9	4	1987
Feb	13.0	1980	8	16.0	1980	6	1982	9	1	1982
Mar	6.5	1998	20	9.5	1979	7	1998	20	1	1998
Apr	6.0	1979	4	6.0	1979	4	1990	6	#	1990
May	.0	0	0	.0	0	0	0	0	0	0
Jun	.0	0	0	.0	0	#	1982	23	#	1982
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	#	1980	28	#	1980	0	0	0	0	0
Nov	6.5	1971	23	6.5	1971	7	1971	23	#+	1995
Dec	6.7	1996	1	11.1	1987	7	1996	1	1+	2000
Ann	13.0	Feb 1980	8	24.6	Jan 1979	9	Jan 1987	9	4	Jan 1987

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	1.1	1.0	.4	.1	.0
Feb	.9	.6	.3	.1	@
Mar	.4	.4	.2	.2	.0
Apr	.1	.1	.1	@	.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	.3	.2	.1	.1	.0
Dec	1.0	.8	.2	.1	.0
Ann	3.8	3.1	1.3	.6	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	1.2	.8	.0	.0
Feb	.2	.2	.1	.0
Mar	.0	.0	.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	.1	.0	.0	.0
Dec	.8	.2	.1	.0
Ann	2.3	1.2	.2	.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	5/12	5/08	5/04	5/01	4/29	4/26	4/23	4/20	4/15
32	5/03	4/28	4/25	4/21	4/19	4/16	4/13	4/09	4/04
28	4/24	4/19	4/15	4/12	4/09	4/06	4/03	3/30	3/25
24	4/12	4/06	4/03	3/30	3/27	3/24	3/21	3/17	3/11
20	4/05	3/30	3/26	3/22	3/19	3/15	3/11	3/07	3/01
16	3/31	3/23	3/17	3/12	3/08	3/03	2/26	2/20	2/12

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	9/28	10/02	10/05	10/08	10/11	10/14	10/20
32	9/26	10/02	10/06	10/09	10/12	10/16	10/19	10/23	10/28
28	10/06	10/12	10/16	10/19	10/23	10/26	10/29	11/02	11/08
24	10/19	10/26	10/31	11/04	11/07	11/11	11/15	11/20	11/27
20	10/26	11/02	11/07	11/12	11/16	11/20	11/24	11/29	12/07
16	11/07	11/13	11/17	11/21	11/25	11/28	12/02	12/06	12/12

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	177	170	166	162	158	154	150	146	139
32	197	190	185	180	176	172	167	162	155
28	217	210	205	200	196	191	187	182	174
24	249	240	234	229	225	220	215	209	201
20	272	261	254	248	242	236	229	222	212
16	293	282	274	268	261	255	248	241	230

***** 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	1187	906	703	363	131	14	0	9	60	285	691	1062	5411
60	1032	771	549	234	59	2	0	1	19	161	544	907	4279
57	940	693	462	169	32	0	0	0	8	104	461	814	3683
55	879	640	404	132	19	0	0	0	4	74	407	753	3312
50	731	513	272	61	4	0	0	0	0	27	283	608	2499
32	276	175	27	0	0	0	0	0	0	0	36	188	702

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	111	193	347	635	967	1220	1437	1381	1084	748	336	149	8608
55	1	14	11	77	273	530	724	668	397	110	16	2	2823
57	0	10	7	54	224	470	662	606	342	77	10	0	2462
60	0	5	1	29	158	382	569	514	263	42	4	0	1967
65	0	0	0	8	75	244	414	367	153	10	0	0	1271
70	0	0	0	1	26	131	268	234	76	1	0	0	737

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	27	84	229	473	763	1019	1226	1181	884	566	192	42	27	111	340	813	1576	2595	3821	5002	5886	6452	6644	6686
45	6	39	138	335	608	869	1071	1026	734	422	107	12	6	45	183	518	1126	1995	3066	4092	4826	5248	5355	5367
50	1	11	70	213	453	719	916	871	584	282	52	3	1	12	82	295	748	1467	2383	3254	3838	4120	4172	4175
55	0	5	31	121	309	569	761	716	438	166	21	0	0	5	36	157	466	1035	1796	2512	2950	3116	3137	3137
60	0	1	7	60	181	420	606	561	312	85	4	0	0	1	8	68	249	669	1275	1836	2148	2233	2237	2237
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	30	73	162	297	482	687	821	785	575	361	127	36	30	103	265	562	1044	1731	2552	3337	3912	4273	4400	4436

(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