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: GOODLAND RENNER AP, KS **COOP ID: 143153**

Climate Division: KS 3 **NWS Call Sign: GLD** **Elevation: 3,645 Feet** **Lat: 39˚22N** **Lon: 101˚42W**

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	39.4	15.8	27.6	79	1951	26	38.2	1986	-26	1959	3	16.8	1979	1147	0	.0	.0	9.2	8.8	30.1	3.7
Feb	45.0	19.7	32.4	81	1970	17	39.4	1976	-22	1982	5	19.2	1978	916	0	.0	.0	12.5	6.1	26.4	1.9
Mar	53.2	26.4	39.8	89	1963	28	46.0	1986	-20	1960	3	34.6	1975	776	0	.0	.0	19.3	2.7	23.8	.4
Apr	62.7	34.8	48.8	96+	1992	30	55.5	1981	4	1989	10	42.6	1984	490	4	.0	.2	24.9	.4	11.7	.0
May	71.7	45.7	58.7	103	2000	29	62.6	2000	21	1967	1	52.0	1995	224	26	@	1.0	30.2	.0	1.4	.0
Jun	83.6	55.5	69.6	107+	1971	26	74.6	1988	31	1951	2	64.7	1982	35	173	1.0	8.7	30.0	.0	.0	.0
Jul	89.1	61.1	75.1	108+	1964	4	79.2	1980	42	1952	8	70.9	1992	5	320	2.2	16.7	31.0	.0	.0	.0
Aug	86.7	59.6	73.2	108	1970	6	82.3	1983	38	1964	23	68.0	1974	10	266	1.1	14.1	31.0	.0	.0	.0
Sep	78.0	50.0	64.0	102+	1971	7	69.4	1998	19	1985	30	58.9	1993	117	99	.1	6.0	29.5	.0	.9	.0
Oct	66.0	37.5	51.8	94	1975	12	55.4	1975	7	1993	30	45.5	1976	407	6	.0	.5	28.0	.3	8.1	.0
Nov	49.6	25.2	37.4	84	1980	6	46.4	1999	-12	1952	28	30.3	1985	812	0	.0	.0	16.2	3.2	24.1	.2
Dec	41.3	17.8	29.6	83	1964	23	35.8	1980	-27	1989	22	13.9	1983	1084	0	.0	.0	9.9	6.8	29.8	2.3
Ann	63.9	37.4	50.7	108+	Aug 1970	6	82.3	Aug 1983	-27	Dec 1989	22	13.9	Dec 1983	6023	894	4.4	47.2	271.7	28.3	156.3	8.5

\+ 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

Issue Date: February 2004

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: GOODLAND RENNER AP, KS **COOP ID: 143153**

Climate Division: KS 3 **NWS Call Sign: GLD** **Elevation: 3,645 Feet** **Lat: 39°22N** **Lon: 101°42W**

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	.43	.35	1.02	1988	19	1.59	1988	.00	1986
Feb	.44	.34	1.03	1950	11	1.54	1984	.02+	1996
Mar	1.20	.85	1.17	1977	11	3.60	1981	.00	1997
Apr	1.51	1.22	2.98	1981	19	3.86	1981	.01	1992
May	3.46	3.46	3.49	1972	27	8.21	1981	.50	2000
Jun	3.30	2.30	4.15	1989	28	9.46	1982	.10	1976
Jul	3.54	3.10	3.65	1985	18	10.10	1985	1.09	1989
Aug	2.49	1.77	3.10	1993	12	9.29	1993	.37	1975
Sep	1.12	.80	2.33	1963	7	5.39	1973	.01	1992
Oct	1.05	.84	2.30	1965	17	4.24	2000	.00	1988
Nov	.82	.65	1.14+	1998	2	2.11	1998	.05	1989
Dec	.40	.29	.82	1982	24	1.58	1982	.00+	1981
Ann	19.76	19.90	4.15	Jun 1989	28	10.10	Jul 1985	.00+	Mar 1997

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	4.6	1.3	.1	@
Feb	4.4	1.3	.2	.0
Mar	6.9	3.2	.7	.1
Apr	7.6	3.8	.9	.2
May	10.6	6.2	2.5	.8
Jun	8.9	5.2	2.2	.8
Jul	9.9	5.9	2.3	1.0
Aug	8.1	4.6	1.5	.6
Sep	5.4	2.5	.6	.2
Oct	4.4	2.4	.6	.2
Nov	5.1	2.2	.4	.1
Dec	4.0	1.1	.1	.0
Ann	79.9	39.7	12.1	4.0

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	.06	.12	.19	.25	.31	.38	.45	.53	.65	.83	.99
Feb	.02	.04	.09	.15	.22	.30	.40	.53	.72	1.04	1.36
Mar	.04	.14	.31	.49	.68	.89	1.15	1.48	1.92	2.67	3.40
Apr	.22	.34	.56	.76	.98	1.22	1.50	1.84	2.30	3.04	3.76
May	.97	1.30	1.79	2.23	2.65	3.10	3.59	4.17	4.92	6.11	7.21
Jun	.44	.71	1.18	1.64	2.12	2.65	3.27	4.03	5.06	6.75	8.37
Jul	.90	1.23	1.74	2.20	2.65	3.12	3.65	4.27	5.09	6.39	7.60
Aug	.32	.51	.87	1.21	1.58	1.99	2.46	3.04	3.83	5.12	6.37
Sep	.04	.10	.22	.36	.54	.74	1.00	1.34	1.82	2.65	3.48
Oct	.01	.05	.16	.29	.45	.65	.91	1.24	1.73	2.57	3.43
Nov	.10	.16	.28	.39	.51	.65	.81	1.01	1.27	1.71	2.14
Dec	.00	.01	.06	.11	.18	.26	.35	.48	.65	.96	1.26
Ann	13.24	14.47	16.07	17.29	18.39	19.45	20.55	21.78	23.27	25.45	27.35

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

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data,
and Information Services

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: GOODLAND RENNER AP, KS **COOP ID: 143153**

Climate Division: KS 3 **NWS Call Sign: GLD** **Elevation: 3,645 Feet** **Lat: 39°22N** **Lon: 101°42W**

Snow (inches)

Snow Totals

Means/Medians (1)

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median
Jan	7.0	5.5	1	1
Feb	5.1	3.5	1	1
Mar	8.5	5.8	1	1
Apr	5.0	3.0	#	1
May	.6	.0	#	0
Jun	.0	.0	#	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.4	.0	#	0
Oct	3.1	.3	#	0
Nov	5.6	4.1	#	0
Dec	5.4	3.5	1	1
Ann	40.7	25.7	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	12.4	1981	29	19.4	1988	16	1988	20	3+	1988
Feb	9.8	1997	23	17.2	1984	12	1981	1	4+	1993
Mar	11.5	1981	7	27.4	1980	15+	1980	30	2+	1987
Apr	8.6	1989	9	22.0	1984	15+	1980	3	2	1980
May	6.5	1990	3	6.5	1990	2	1978	6	#	2000
Jun	.0	0	0	.0	0	0	0	0	#	1990
Jul	.0	0	0	.0	0	0	0	0	0	0
Aug	.0	0	0	.0	0	0	0	0	0	0
Sep	3.8	1995	20	5.8	1995	5+	1995	21	#	2000
Oct	19.3	1997	25	19.5	1997	16+	1997	27	2	1997
Nov	14.9	1983	27	23.3	1983	19+	1983	29	3	1983
Dec	9.1	1982	24	17.3	1979	17	1983	1	4	1983
Ann	19.3	Oct 1997	25	27.4	Mar 1980	19+	Nov 1983	29	4+	Feb 1993

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	4.8	1.9	.7	.2	.1
Feb	4.1	1.5	.5	.2	.0
Mar	4.5	2.5	.9	.5	.1
Apr	2.1	1.3	.7	.4	.0
May	.3	.3	@	@	.0
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.2	.1	.1	.0	.0
Oct	1.0	.7	.3	.2	.1
Nov	3.1	1.6	.6	.2	.1
Dec	3.7	1.4	.6	.2	.0
Ann	23.8	11.3	4.4	1.9	.4

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	10.3	4.9	2.7	.4
Feb	7.2	4.2	2.5	.2
Mar	4.6	2.3	1.1	.3
Apr	1.7	.9	.4	.2
May	.1	.0	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.1	.1	.1	.0
Oct	.7	.4	.2	.1
Nov	4.6	2.4	1.1	.1
Dec	6.9	3.0	1.2	.3
Ann	36.2	18.2	9.3	1.6

+ 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

Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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: GOODLAND RENNER AP, KS **COOP ID: 143153**

Climate Division: KS 3 **NWS Call Sign: GLD** **Elevation: 3,645 Feet** **Lat: 39˚22N** **Lon: 101˚42W**

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	5/23	5/19	5/16	5/14	5/11	5/09	5/07	5/04	4/30
32	5/18	5/14	5/10	5/07	5/05	5/02	4/29	4/25	4/21
28	5/06	5/01	4/28	4/25	4/22	4/19	4/16	4/12	4/07
24	4/23	4/18	4/15	4/12	4/10	4/07	4/04	4/01	3/28
20	4/09	4/04	4/01	3/30	3/27	3/25	3/22	3/19	3/14
16	4/06	3/31	3/27	3/23	3/20	3/16	3/12	3/08	3/02

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	9/14	9/19	9/22	9/25	9/28	9/30	10/03	10/07	10/11
32	9/20	9/24	9/28	10/01	10/04	10/06	10/09	10/13	10/17
28	10/05	10/09	10/12	10/14	10/17	10/19	10/22	10/25	10/29
24	10/12	10/17	10/20	10/23	10/26	10/29	11/01	11/04	11/09
20	10/19	10/25	10/29	11/02	11/05	11/09	11/13	11/17	11/23
16	10/31	11/06	11/10	11/13	11/16	11/19	11/23	11/27	12/02

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	157	151	146	142	139	135	131	126	120
32	173	165	160	156	151	147	143	137	130
28	195	189	184	181	177	174	170	166	160
24	215	209	205	202	198	195	191	187	181
20	246	238	232	227	223	218	213	207	199
16	263	256	250	245	241	236	232	226	218

***** 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

Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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: GOODLAND RENNER AP, KS **COOP ID: 143153**

Climate Division: KS 3 **NWS Call Sign: GLD** **Elevation: 3,645 Feet** **Lat: 39˚22N** **Lon: 101˚42W**

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	1147	916	776	490	224	35	5	10	117	407	812	1084	6023
60	1004	774	627	347	116	9	0	4	43	262	677	944	4807
57	911	690	534	267	71	3	0	1	20	182	587	851	4117
55	849	638	472	220	49	1	0	0	11	137	529	789	3695
50	697	508	325	121	14	0	0	0	1	55	391	640	2752
32	233	148	21	0	0	0	0	0	0	0	65	199	666

Base — Cooling Degree Days (1)

Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	93	152	295	513	830	1128	1340	1284	973	627	235	112	7582
55	0	1	7	45	169	440	627	571	311	75	3	0	2249
57	0	0	4	32	129	382	565	509	262	52	1	0	1936
60	0	0	1	17	81	298	472	418	194	27	0	0	1508
65	0	0	0	4	26	173	320	266	99	6	0	0	894
70	0	0	0	1	5	77	181	140	39	1	0	0	444

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	55	135	302	592	895	1099	1046	745	403	102	31	25	80	215	517	1109	2004	3103	4149	4894	5297	5399	5430
45	2	21	71	189	441	745	944	891	597	270	52	7	2	23	94	283	724	1469	2413	3304	3901	4171	4223	4230
50	0	4	30	103	298	595	789	736	458	163	16	0	0	4	34	137	435	1030	1819	2555	3013	3176	3192	3192
55	0	0	5	51	174	448	634	581	320	80	0	0	0	0	5	56	230	678	1312	1893	2213	2293	2293	2293
60	0	0	0	17	86	305	481	429	199	28	0	0	0	0	0	17	103	408	889	1318	1517	1545	1545	1545
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	35	71	132	221	363	565	712	675	469	281	97	41	35	106	238	459	822	1387	2099	2774	3243	3524	3621	3662

(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