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: GREAT SAND DUNES N M, CO **COOP ID: 053541**

Climate Division: CO 5 **NWS Call Sign:** **Elevation: 8,120 Feet** **Lat: 37˚44N** **Lon: 105˚31W**

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	34.3	8.0	21.2	67	1971	31	29.2	1986	-25	1963	13	13.0	1984	1359	0	.0	.0	1.3	12.2	31.0	5.4
Feb	38.7	12.7	25.7	63	1986	26	36.0	1995	-22	1985	2	17.6	1979	1101	0	.0	.0	3.6	6.1	28.1	2.7
Mar	46.2	21.3	33.8	72	1971	26	40.2	1999	-7	1965	3	28.6	1973	970	0	.0	.0	13.2	1.3	29.3	.1
Apr	54.6	27.6	41.1	78	1989	22	46.4	1992	-6	1973	8	34.6	1973	717	0	.0	.0	22.7	.3	21.7	@
May	64.8	36.6	50.7	89	2000	24	57.3	1996	15+	1962	1	46.5	1995	445	1	.0	.0	29.5	.0	8.2	.0
Jun	76.1	45.6	60.9	96	1982	29	65.0	1994	25	1954	7	56.2	1983	146	21	.0	.4	29.9	.0	.5	.0
Jul	80.2	50.8	65.5	94+	1982	18	68.9	1980	31	1967	17	62.5	1995	42	59	.0	.6	31.0	.0	.0	.0
Aug	77.7	49.3	63.5	89	1954	2	66.6	2000	33+	1967	18	60.5	1974	73	27	.0	.0	31.0	.0	.0	.0
Sep	70.8	42.3	56.6	87+	1990	1	61.3	1998	22+	1985	30	53.8+	1973	256	3	.0	.0	29.7	.0	2.1	.0
Oct	59.9	32.2	46.1	80	1963	5	50.7	1979	2	1993	30	40.1	1984	587	0	.0	.0	26.7	.3	16.1	.0
Nov	45.0	19.8	32.4	67+	2001	1	39.7	1999	-12	1957	28	24.8	1972	978	0	.0	.0	11.4	4.1	28.9	.8
Dec	35.8	10.2	23.0	60	1970	9	32.8	1980	-19+	1961	13	16.1	1978	1303	0	.0	.0	1.9	10.9	30.9	4.4
Ann	57.0	29.7	43.4	96	Jun 1982	29	68.9	Jul 1980	-25	Jan 1963	13	13.0	Jan 1984	7977	111	.0	1.0	231.9	35.2	196.8	13.4

\+ 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: 1950-2001

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

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Climate Division: CO 5 **NWS Call Sign:** **Elevation: 8,120 Feet** **Lat: 37˚44N** **Lon: 105˚31W**

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	.46	.29	.74	1999	22	1.55	1979	.01+	1981
Feb	.39	.35	.70	1989	20	1.41	1989	.03	1995
Mar	.88	.69	1.30	1992	4	2.41	1992	.12	1971
Apr	.90	.84	1.17	1998	3	2.16	1998	.00	1974
May	1.13	.96	1.95	1955	18	2.97	1993	.02	1975
Jun	.88	.81	1.14	1995	30	2.41	1995	.05	1980
Jul	1.69	1.40	1.83	1968	27	3.91	1998	.22	1994
Aug	1.95	1.89	1.45	1954	6	5.14	1993	.25	1985
Sep	1.23	.96	2.10	1985	29	3.50	1985	.04	1978
Oct	.95	.70	1.22	1990	20	2.57	1998	.09	1995
Nov	.62	.56	1.18	1997	28	2.19	1997	.00	1989
Dec	.43	.42	.80	1988	15	1.13	1991	.01	1980
Ann	11.51	11.35	2.10	Sep 1985	29	5.14	Aug 1993	.00+	Nov 1989

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	4.4	1.4	.2	.0
Feb	4.1	1.3	.1	.0
Mar	5.8	3.0	.3	@
Apr	5.8	2.9	.3	@
May	7.6	3.7	.3	@
Jun	6.0	2.6	.3	.1
Jul	10.2	4.5	.7	.2
Aug	11.3	5.7	.8	.2
Sep	7.2	3.5	.5	.1
Oct	5.3	2.6	.4	@
Nov	4.6	1.9	.2	@
Dec	4.4	1.6	.1	.0
Ann	76.7	34.7	4.2	.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	.02	.04	.08	.14	.21	.30	.40	.55	.75	1.10	1.45
Feb	.05	.08	.13	.19	.24	.31	.38	.47	.60	.80	1.00
Mar	.13	.20	.33	.45	.58	.72	.88	1.08	1.34	1.78	2.20
Apr	.02	.08	.19	.32	.46	.63	.83	1.09	1.46	2.07	2.68
May	.10	.18	.33	.49	.66	.85	1.08	1.37	1.77	2.43	3.08
Jun	.07	.13	.24	.36	.50	.65	.83	1.07	1.39	1.93	2.46
Jul	.30	.45	.70	.93	1.17	1.42	1.71	2.06	2.52	3.27	3.99
Aug	.48	.66	.94	1.20	1.45	1.71	2.00	2.35	2.81	3.54	4.22
Sep	.17	.27	.45	.62	.80	1.00	1.22	1.50	1.88	2.49	3.08
Oct	.13	.20	.34	.47	.61	.76	.94	1.15	1.45	1.93	2.40
Nov	.01	.05	.13	.22	.32	.44	.58	.76	1.01	1.44	1.86
Dec	.03	.06	.11	.17	.24	.32	.41	.52	.69	.96	1.23
Ann	7.12	7.92	8.97	9.79	10.52	11.24	11.99	12.83	13.86	15.38	16.72

\+ 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: 1950-2001
(3) Derived from 1971-2000 serially complete daily data

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Snow (inches)

Snow Totals

Means/Medians (1)

Extremes (2)

Mean Number of Days (1)

Snow Fall >= Thresholds

Snow Depth >= Thresholds

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median	Highest Daily Snow Fall	Year	Day	Highest Monthly Snow Fall	Year	Highest Daily Snow Depth	Year	Day	Highest Monthly Mean Snow Depth	Year	0.1	1.0	3.0	5.0	10.0	1	3	5	10
Jan	6.7	3.0	4	2	9.0	1992	7	15.9	1979	18+	1992	7	14	1992	3.9	2.2	.8	.4	.0	9.4	7.2	3.8	.6
Feb	5.5	5.0	3	1	8.0	1989	6	25.1	1989	16	1989	21	12	1992	3.3	1.7	.5	.2	.0	5.5	3.5	2.6	.0
Mar	8.8	8.2	2	#	14.0	1992	4	20.7	1981	24	1992	5	15	1992	4.4	2.8	1.1	.3	.1	4.2	1.6	.2	.0
Apr	5.1	3.1	#	#	10.0	1986	3	18.6	1997	12	1998	3	2	1998	2.8	1.8	.6	.3	@	1.5	.6	.5	.1
May	1.8	.0	#	0	10.0	1999	2	17.5	1999	9	1999	2	1	1999	.9	.5	.3	.1	@	.4	.1	.1	.0
Jun	.0	.0	#	0	.3	1995	9	.3	1995	#	1995	9	#	1995	@	.0	.0	.0	.0	.0	.0	.0	.0
Jul	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Aug	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Sep	.1	.0	#	0	2.0	1971	17	2.3	1971	2	1971	19	#+	1996	.1	@	.0	.0	.0	.1	.0	.0	.0
Oct	2.5	.5	#	#	7.0	1972	23	13.5	1972	10	1991	31	1	1998	1.5	.9	.3	.1	.0	1.1	.4	.2	@
Nov	4.9	4.7	1	#	14.0	1997	28	14.0	1997	16	1997	29	5	1991	2.9	1.8	.5	.2	@	5.2	.8	.3	.2
Dec	5.6	6.0	3	1	12.0	1972	12	18.0	1972	20	1991	12	16	1991	3.8	2.2	.6	.2	@	16.1	10.2	7.1	2.0
Ann	41.0	30.5	N/A	N/A	14.0+	Nov 1997	28	25.1	Feb 1989	24	Mar 1992	5	16	Dec 1991	23.6	13.9	4.7	1.8	.1	43.5	24.4	14.8	2.9

+ 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	6/27	6/21	6/17	6/13	6/10	6/07	6/03	5/30	5/24
32	6/13	6/07	6/03	5/30	5/26	5/23	5/19	5/15	5/09
28	5/29	5/24	5/20	5/17	5/14	5/11	5/08	5/04	4/29
24	5/16	5/11	5/07	5/05	5/02	4/29	4/26	4/23	4/18
20	5/03	4/27	4/23	4/20	4/17	4/14	4/10	4/07	4/01
16	4/26	4/20	4/16	4/12	4/09	4/06	4/02	3/29	3/23

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	9/03	9/07	9/10	9/13	9/16	9/18	9/21	9/24	9/28
32	9/12	9/16	9/19	9/21	9/24	9/26	9/29	10/02	10/06
28	9/23	9/27	9/30	10/03	10/05	10/08	10/10	10/13	10/18
24	9/30	10/05	10/10	10/13	10/17	10/20	10/24	10/28	11/03
20	10/13	10/18	10/21	10/24	10/27	10/30	11/02	11/05	11/10
16	10/17	10/22	10/26	10/29	11/01	11/04	11/07	11/11	11/16

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	120	112	106	101	97	92	87	82	73
32	142	134	129	124	120	115	110	105	97
28	166	158	152	148	143	139	134	129	121
24	191	183	177	172	167	162	157	151	143
20	215	207	202	197	192	188	183	178	170
16	229	221	215	210	205	201	196	190	182

***** 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	1359	1101	970	717	445	146	42	73	256	587	978	1303	7977
60	1204	961	815	567	298	57	4	12	130	433	828	1148	6457
57	1111	877	722	478	220	26	0	2	75	343	738	1055	5647
55	1049	821	660	420	173	14	0	1	48	286	678	993	5143
50	894	681	506	283	83	2	0	0	11	164	530	838	3992
32	371	228	90	15	0	0	0	0	0	3	112	313	1132

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	35	51	143	288	579	865	1040	977	737	439	124	33	5311
55	0	0	0	3	40	189	327	264	95	10	0	0	928
57	0	0	0	1	24	141	265	204	61	4	0	0	700
60	0	0	0	0	9	82	176	120	27	1	0	0	415
65	0	0	0	0	1	21	59	27	3	0	0	0	111
70	0	0	0	0	0	2	7	1	0	0	0	0	10

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	0	0	38	141	363	640	795	729	505	227	27	0	0	0	38	179	542	1182	1977	2706	3211	3438	3465	3465
45	0	0	5	63	225	490	640	574	358	112	1	0	0	0	5	68	293	783	1423	1997	2355	2467	2468	2468
50	0	0	0	16	110	342	485	419	222	42	0	0	0	0	0	16	126	468	953	1372	1594	1636	1636	1636
55	0	0	0	0	40	203	330	266	103	5	0	0	0	0	0	0	40	243	573	839	942	947	947	947
60	0	0	0	0	5	92	182	122	28	0	0	0	0	0	0	0	5	97	279	401	429	429	429	429
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	7	47	129	257	413	506	456	332	179	39	0	0	7	54	183	440	853	1359	1815	2147	2326	2365	2365

(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

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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