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: CRYSTAL CITY, TX **COOP ID: 412160**

Climate Division: TX 9 **NWS Call Sign:** **Elevation: 580 Feet** **Lat: 28˚41N** **Lon: 99˚50W**

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	66.6	42.6	54.6	92	1971	3	60.6	1998	11	1962	12	47.6	1979	343	20	.0	.1	28.3	.1	4.0	.0
Feb	71.8	46.9	59.4	100	1986	20	67.1	1999	13	1951	2	51.6	1978	194	37	@	.7	27.0	.1	2.1	.0
Mar	79.7	54.5	67.1	103	1971	28	72.1	2000	22	1980	2	61.8	1987	57	122	.1	3.2	30.9	.0	.5	.0
Apr	85.0	60.9	73.0	107	1984	20	77.7	1986	32	1973	9	67.5	1987	8	247	.3	7.7	30.0	.0	@	.0
May	90.1	68.4	79.3	105+	1984	5	84.5	1998	42	1970	3	74.1	1976	1	443	1.4	16.3	31.0	.0	.0	.0
Jun	94.5	72.9	83.7	109+	1998	15	90.0	1998	56	1955	11	80.2	1979	0	562	4.6	26.0	30.0	.0	.0	.0
Jul	97.1	74.3	85.7	109+	2000	16	90.8	1998	65	1975	15	79.8	1976	0	641	8.4	29.3	31.0	.0	.0	.0
Aug	96.8	74.2	85.5	108+	2001	15	88.7	2000	65	1961	27	80.4	1971	0	635	7.0	29.4	31.0	.0	.0	.0
Sep	92.3	70.4	81.4	115	2000	5	85.2	2000	50+	1948	29	75.5	1974	0	490	1.8	21.9	30.0	.0	.0	.0
Oct	84.5	62.3	73.4	101	1951	3	75.8	1998	29	1993	31	64.6	1976	8	268	.1	8.1	31.0	.0	.1	.0
Nov	74.3	52.1	63.2	93	1988	4	67.9	1973	23	1948	29	54.7	1976	131	76	.0	.2	29.7	.0	.8	.0
Dec	67.2	44.2	55.7	95	1951	6	62.7	1984	11	1989	23	47.2	1989	305	17	.0	.1	29.3	.0	3.3	.0
Ann	83.3	60.3	71.8	115	Sep 2000	5	90.8	Jul 1998	11+	Dec 1989	23	47.2	Dec 1989	1047	3558	23.7	143.0	359.2	.2	10.8	.0

+ 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	.93	.65	1.33	1991	18	3.65	1992	.00+	1996
Feb	1.08	.65	2.15	2000	2	3.85	1973	.00	1976
Mar	1.08	.50	2.97	1998	16	4.45	1990	.00	1971
Apr	1.75	1.49	2.79	1974	30	5.08	1979	.00	1984
May	2.41	1.76	4.75	1951	24	6.62	1980	.00	1998
Jun	3.25	2.87	4.40	1963	17	10.90	1999	.00+	1990
Jul	1.67	.88	4.44	1990	17	11.49	1990	.00	1993
Aug	2.03	.95	3.54	1999	24	11.48	1971	.00	1985
Sep	2.10	2.02	3.83	1948	9	5.12	1978	.23	1977
Oct	2.44	1.75	6.83	1959	4	7.08	1986	.00	1987
Nov	1.12	.93	2.28	1980	16	4.03	1980	.01	1971
Dec	.84	.57	1.52	1986	22	3.21	1986	.00	1973
Ann	20.70	20.15	6.83	Oct 1959	4	11.49	Jul 1990	.00+	May 1998

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	6.1	2.2	.5	.1
Feb	5.0	2.1	.6	.2
Mar	4.6	2.0	.5	.3
Apr	5.2	2.8	1.2	.5
May	6.6	3.7	1.7	.7
Jun	5.7	4.2	2.0	1.1
Jul	3.7	2.2	1.0	.5
Aug	4.3	2.8	1.3	.6
Sep	5.7	3.8	1.5	.5
Oct	5.2	3.5	1.7	.8
Nov	4.7	2.3	.6	.2
Dec	5.9	2.0	.5	.1
Ann	62.7	33.6	13.1	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	.00	.00	.15	.30	.46	.65	.87	1.16	1.54	2.21	2.86
Feb	.01	.04	.13	.26	.42	.63	.90	1.26	1.78	2.71	3.66
Mar	.01	.05	.17	.31	.48	.68	.94	1.29	1.78	2.64	3.51
Apr	.04	.16	.39	.64	.91	1.24	1.63	2.13	2.82	4.00	5.17
May	.14	.37	.74	1.10	1.47	1.89	2.38	2.97	3.79	5.13	6.43
Jun	.00	.26	.80	1.31	1.85	2.45	3.16	4.03	5.23	7.23	9.18
Jul	.00	.03	.13	.29	.52	.84	1.26	1.86	2.77	4.42	6.15
Aug	.01	.08	.27	.52	.83	1.22	1.72	2.39	3.36	5.06	6.80
Sep	.38	.57	.87	1.16	1.45	1.77	2.13	2.56	3.14	4.07	4.96
Oct	.03	.16	.44	.77	1.15	1.62	2.19	2.94	4.00	5.82	7.66
Nov	.03	.07	.18	.32	.49	.70	.96	1.32	1.82	2.71	3.62
Dec	.01	.04	.12	.23	.36	.52	.72	.99	1.38	2.06	2.76
Ann	11.09	12.75	14.99	16.76	18.38	19.99	21.69	23.61	26.00	29.56	32.73

\+ 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

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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	.2	.0	#	0	3.5	1985	13	5.6	1985	3	1985	13	#	1985	.1	.1	@	.0	.0	.1	@	.0	.0
Feb	.1	.0	#	0	1.5	1973	9	1.5	1973	2	1973	9	#	1973	@	@	.0	.0	.0	@	.0	.0	.0
Mar	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Apr	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
May	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Jun	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.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	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Oct	#	.0	0	0	#	1993	30	#	1993	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Nov	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Dec	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Ann	.3	.0	N/A	N/A	3.5	Jan 1985	13	5.6	Jan 1985	3	Jan 1985	13	#+	Jan 1985	.1	.1	@	.0	.0	.1	@	.0	.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	3/25	3/16	3/10	3/05	3/01	2/24	2/19	2/13	2/05
32	3/20	3/09	3/01	2/23	2/16	2/10	2/04	1/27	1/16
28	2/23	2/12	2/04	1/28	1/22	1/15	1/07	12/27	0/00
24	2/03	1/23	1/13	1/04	12/23	0/00	0/00	0/00	0/00
20	1/12	1/01	12/19	0/00	0/00	0/00	0/00	0/00	0/00
16	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00

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	11/05	11/11	11/15	11/18	11/22	11/25	11/29	12/03	12/09
32	11/10	11/19	11/25	12/01	12/06	12/11	12/17	12/23	1/01
28	11/30	12/08	12/14	12/19	12/24	12/29	1/04	1/12	0/00
24	12/11	12/23	1/01	1/11	1/24	0/00	0/00	0/00	0/00
20	12/25	1/05	1/21	0/00	0/00	0/00	0/00	0/00	0/00
16	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	293	284	277	271	266	260	254	247	238
32	336	321	310	300	292	283	274	263	248
28	>365	>365	362	347	337	328	320	310	297
24	>365	>365	>365	>365	>365	>365	>365	353	333
20	>365	>365	>365	>365	>365	>365	>365	>365	>365
16	>365	>365	>365	>365	>365	>365	>365	>365	>365

***** 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)

Base — Heating Degree Days (1)

Below	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
65	343	194	57	8	1	0	0	0	0	8	131	305	1047
60	221	109	17	0	0	0	0	0	0	1	62	185	595
57	164	70	6	0	0	0	0	0	0	0	35	130	405
55	131	50	3	0	0	0	0	0	0	0	22	98	304
50	62	17	0	0	0	0	0	0	0	0	6	39	124
32	0	0	0	0	0	0	0	0	0	0	0	0	0

Base — Cooling Degree Days (1)

Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	700	766	1089	1229	1465	1552	1664	1658	1480	1283	935	735	14556
55	118	172	379	539	752	862	951	945	790	570	266	120	6464
57	89	137	320	479	690	802	889	883	730	509	219	90	5837
60	53	92	237	389	597	712	796	790	640	416	156	52	4930
65	20	37	122	247	443	562	641	635	490	268	76	17	3558
70	6	12	47	129	296	412	486	480	341	141	27	3	2380

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	465	576	844	1000	1228	1326	1435	1433	1259	1046	707	504	465	1041	1885	2885	4113	5439	6874	8307	9566	10612	11319	11823
45	329	442	689	850	1073	1176	1280	1278	1109	891	558	357	329	771	1460	2310	3383	4559	5839	7117	8226	9117	9675	10032
50	204	311	537	700	918	1026	1125	1123	959	736	410	230	204	515	1052	1752	2670	3696	4821	5944	6903	7639	8049	8279
55	110	197	390	552	763	876	970	968	809	584	283	125	110	307	697	1249	2012	2888	3858	4826	5635	6219	6502	6627
60	47	105	255	405	608	726	815	813	659	431	177	56	47	152	407	812	1420	2146	2961	3774	4433	4864	5041	5097
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	286	358	554	672	843	901	956	955	856	714	453	306	286	644	1198	1870	2713	3614	4570	5525	6381	7095	7548	7854

(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