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: MENARD, TX **COOP ID: 415822**

Climate Division: TX 6 **NWS Call Sign:** **Elevation: 1,951 Feet** **Lat: 30˚55N** **Lon: 99˚47W**

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	60.4	30.7	45.6	91	1927	6	50.9	2000	-2	1930	18	38.3	1979	604	0	.0	.0	24.9	.7	18.4	.0
Feb	65.6	34.7	50.2	97+	1996	22	58.3	2000	-1	1985	2	42.1	1978	417	1	.0	.2	24.8	.5	12.1	@
Mar	73.3	42.5	57.9	98+	1967	28	64.0	1974	7+	1980	2	50.8	1987	243	22	.0	.7	30.1	@	6.8	.0
Apr	80.8	49.7	65.3	107	1925	18	71.6	1986	20+	1971	7	60.1	1997	85	93	.1	4.4	30.0	.0	1.8	.0
May	86.6	59.3	73.0	114	1927	29	80.0	2000	27	1903	1	69.1	1972	18	265	1.0	10.8	31.0	.0	.1	.0
Jun	91.3	65.8	78.6	112	1928	9	83.7	1990	43+	1919	3	74.0	1995	0	406	2.0	19.7	30.0	.0	.0	.0
Jul	94.8	68.0	81.4	110+	1925	15	85.8	1998	48	1905	10	76.2	1976	0	507	5.4	26.6	31.0	.0	.0	.0
Aug	93.9	66.8	80.4	109+	1986	20	84.3	1999	40	1915	31	74.2	1971	0	475	3.6	25.4	31.0	.0	.0	.0
Sep	88.4	61.0	74.7	109	1927	1	81.0	1977	33	1989	25	66.8	1974	9	300	.8	13.9	30.0	.0	.0	.0
Oct	80.0	51.0	65.5	99+	1979	3	69.5	1979	21+	1993	31	58.7	1976	71	88	.0	2.8	30.8	.0	1.2	.0
Nov	68.6	40.2	54.4	91	1980	8	59.9	1985	9	1979	30	48.3	1976	330	11	.0	.1	28.4	@	8.7	.0
Dec	61.4	32.3	46.9	84+	1981	21	53.3	1984	-6	1929	22	39.4	1983	563	0	.0	.0	26.5	.6	16.8	.1
Ann	78.8	50.2	64.5	114	May 1927	29	85.8	Jul 1998	-6	Dec 1929	22	38.3	Jan 1979	2340	2168	12.9	104.6	348.5	1.8	65.9	.1

\+ 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: 1897-2001

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

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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	.97	.76	1.83	1968	20	3.19	1983	.00	1971
Feb	1.48	1.28	2.50	1932	14	5.15	1992	.02	1999
Mar	1.60	1.24	3.03	1998	16	4.47	1999	.00	1971
Apr	1.72	1.65	3.84	1944	30	4.16	1993	.10	1998
May	3.22	2.90	3.91	1988	11	8.59	1995	.29	1998
Jun	3.38	3.15	4.37	1977	24	7.14	1973	.68	1989
Jul	2.14	1.40	4.40+	1938	21	9.74	1976	.00+	1997
Aug	2.34	1.54	4.70	1942	18	10.75	1974	.02	2000
Sep	2.69	2.15	6.03	1936	16	9.12	1980	.00	1979
Oct	2.57	1.47	4.20	1973	13	10.31	1973	.03	1987
Nov	1.51	1.31	3.12	2000	3	7.62	2000	.00+	1999
Dec	1.28	.86	3.22	1991	20	7.27	1991	.01	1973
Ann	24.90	23.90	6.03	Sep 1936	16	10.75	Aug 1974	.00+	Nov 1999

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	5.1	2.5	.5	.1
Feb	5.0	3.0	.9	.3
Mar	5.3	3.1	1.0	.3
Apr	4.9	3.1	1.2	.4
May	7.1	5.0	2.3	.9
Jun	6.0	4.3	2.4	1.2
Jul	4.5	2.8	1.2	.7
Aug	5.1	3.4	1.4	.7
Sep	5.7	3.8	1.7	.8
Oct	5.7	3.9	1.7	.8
Nov	4.2	2.5	.9	.4
Dec	4.5	2.6	.7	.2
Ann	63.1	40.0	15.9	6.8

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	.09	.22	.35	.51	.69	.90	1.18	1.56	2.21	2.85
Feb	.10	.19	.38	.58	.81	1.07	1.39	1.80	2.36	3.32	4.27
Mar	.06	.19	.42	.65	.90	1.19	1.53	1.96	2.56	3.55	4.52
Apr	.32	.47	.72	.96	1.20	1.45	1.75	2.10	2.57	3.32	4.04
May	.43	.70	1.16	1.60	2.07	2.59	3.19	3.93	4.93	6.56	8.13
Jun	.86	1.18	1.67	2.11	2.54	2.99	3.49	4.08	4.86	6.09	7.24
Jul	.00	.06	.31	.60	.95	1.37	1.89	2.57	3.54	5.21	6.89
Aug	.08	.19	.44	.74	1.10	1.53	2.08	2.79	3.81	5.57	7.36
Sep	.06	.23	.58	.96	1.39	1.89	2.50	3.27	4.36	6.21	8.05
Oct	.18	.34	.67	1.02	1.41	1.87	2.42	3.12	4.09	5.72	7.34
Nov	.00	.19	.47	.71	.96	1.22	1.52	1.88	2.37	3.16	3.93
Dec	.03	.07	.18	.33	.52	.76	1.07	1.49	2.09	3.17	4.28
Ann	16.87	18.40	20.36	21.86	23.21	24.51	25.86	27.36	29.19	31.85	34.17

\+ 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: 1897-2001
(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	1.3	.0	#	0
Feb	.6	.0	#	0
Mar	#	.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	#	.0	#	0
Dec	#	.0	#	0
Ann	1.9	.0	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	4.0	1973	25	7.0	1973	4	1973	25	#	1973
Feb	6.0	1973	9	7.0	1973	#+	1994	10	#+	1994
Mar	#	1982	6	#+	1982	#	1978	3	#	1978
Apr	.0	0	0	.0	0	0	0	0	0	0
May	.0	0	0	.0	0	0	0	0	0	0
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	.0	0	0	.0	0	0	0	0	0	0
Oct	.0	0	0	.0	0	0	0	0	0	0
Nov	#	1980	26	#+	1980	4	1996	24	#	1996
Dec	#	1972	10	#	1972	6	1986	11	#	1986
Ann	6.0	Feb 1973	9	7.0+	Feb 1973	6	Dec 1986	11	#+	Nov 1996

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	.5	.5	.3	.0	.0
Feb	.3	.2	.1	.1	.0
Mar	.0	.0	.0	.0	.0
Apr	.0	.0	.0	.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	.0	.0	.0	.0	.0
Nov	.0	.0	.0	.0	.0
Dec	.0	.0	.0	.0	.0
Ann	.8	.7	.4	.1	.0

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	.1	.1	.0	.0
Feb	.0	.0	.0	.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	.0	.0	.0	.0
Dec	.0	.0	.0	.0
Ann	.1	.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	5/07	5/01	4/26	4/22	4/18	4/15	4/11	4/06	3/31
32	4/25	4/19	4/15	4/11	4/07	4/04	3/31	3/26	3/20
28	4/11	4/04	3/31	3/26	3/23	3/19	3/15	3/10	3/03
24	3/29	3/20	3/14	3/09	3/04	2/28	2/23	2/16	2/08
20	3/17	3/08	3/01	2/23	2/18	2/12	2/07	1/31	1/22
16	3/04	2/20	2/11	2/04	1/28	1/20	1/11	12/28	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	10/02	10/08	10/12	10/16	10/19	10/22	10/26	10/30	11/05
32	10/15	10/20	10/24	10/27	10/29	11/01	11/04	11/08	11/13
28	10/21	10/27	11/01	11/04	11/08	11/11	11/15	11/20	11/26
24	10/29	11/04	11/09	11/12	11/16	11/19	11/23	11/28	12/04
20	11/07	11/16	11/22	11/27	12/03	12/08	12/13	12/19	12/28
16	11/21	11/29	12/06	12/11	12/17	12/23	12/31	1/14	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	208	199	193	188	183	178	173	166	158
32	228	220	214	209	204	200	195	189	181
28	257	247	241	235	230	224	218	212	202
24	286	275	268	262	256	250	244	236	226
20	323	311	302	294	287	280	272	263	251
16	>365	>365	>365	341	326	315	306	296	283

***** 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	604	417	243	85	18	0	0	0	9	71	330	563	2340
60	456	287	135	29	4	0	0	0	0	22	207	411	1551
57	370	216	86	13	0	0	0	0	0	8	148	325	1166
55	315	175	60	7	0	0	0	0	0	4	114	270	945
50	198	93	20	0	0	0	0	0	0	1	52	154	518
32	9	0	0	0	0	0	0	0	0	0	0	1	10

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	428	509	802	997	1270	1396	1530	1498	1281	1039	672	461	11883
55	22	39	149	314	557	706	817	785	591	331	96	17	4424
57	14	25	113	260	496	646	755	723	531	273	69	10	3915
60	7	12	69	187	406	556	662	630	441	194	39	3	3206
65	0	1	22	93	265	406	507	475	300	88	11	0	2168
70	0	0	5	34	150	262	352	324	176	28	2	0	1333

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	236	334	569	763	1031	1165	1289	1256	1048	802	449	259	236	570	1139	1902	2933	4098	5387	6643	7691	8493	8942	9201
45	132	217	422	615	876	1015	1134	1101	898	649	318	147	132	349	771	1386	2262	3277	4411	5512	6410	7059	7377	7524
50	68	123	287	468	721	865	979	946	748	496	204	76	68	191	478	946	1667	2532	3511	4457	5205	5701	5905	5981
55	25	60	171	329	566	715	824	791	599	350	117	30	25	85	256	585	1151	1866	2690	3481	4080	4430	4547	4577
60	2	22	89	205	413	565	669	636	452	213	52	4	2	24	113	318	731	1296	1965	2601	3053	3266	3318	3322
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	202	259	394	512	682	778	842	821	697	542	314	210	202	461	855	1367	2049	2827	3669	4490	5187	5729	6043	6253

(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