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: PANDALE 1 N, TX **COOP ID: 416780**

Climate Division: TX 7 **NWS Call Sign:** **Elevation: 1,689 Feet** **Lat: 30˚10N** **Lon: 101˚33W**

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	61.8	30.4	46.1	90	2000	20	50.8	1998	9+	1972	6	39.5	1979	586	0	.0	@	25.9	.4	17.1	.0
Feb	67.0	34.8	50.9	98	1986	21	57.3	2000	12	1978	10	43.8	1978	396	1	.0	.3	25.9	.2	10.0	.0
Mar	75.3	44.1	59.7	101	1967	29	65.3	1974	18+	1993	13	53.7	1987	189	25	.0	1.4	30.6	.0	2.7	.0
Apr	82.4	52.8	67.6	106	1996	26	73.6	1986	26	1973	9	60.6	1997	53	131	.3	6.6	30.0	.0	.3	.0
May	89.5	63.3	76.4	109	2000	25	82.3	1996	37	1970	3	71.1	1976	6	359	2.0	15.5	31.0	.0	.0	.0
Jun	93.6	70.2	81.9	110+	1994	29	86.8	1990	45	1970	3	78.3	1979	0	506	4.0	24.3	30.0	.0	.0	.0
Jul	95.9	72.7	84.3	110	1995	30	88.7	1998	61	1975	17	77.0	1976	0	598	7.7	28.0	31.0	.0	.0	.0
Aug	95.4	71.5	83.5	111	1969	18	88.3	1977	60+	1980	11	76.2	1971	0	573	5.5	26.1	31.0	.0	.0	.0
Sep	90.2	64.5	77.4	108	2000	6	84.5	1977	39	1989	25	70.2	1974	3	373	1.7	18.2	30.0	.0	.0	.0
Oct	81.1	54.3	67.7	100+	1979	4	71.9	1979	21	1993	31	61.0	1976	46	130	.1	3.7	30.8	.0	.4	.0
Nov	69.7	41.3	55.5	93	1980	8	60.5	1985	15	1993	27	49.8	1976	294	8	.0	.2	28.7	@	5.3	.0
Dec	62.5	31.5	47.0	89	1977	5	52.7	1984	3+	1989	24	38.3	1983	558	0	.0	.0	26.4	.6	15.3	.0
Ann	80.4	52.6	66.5	111	Aug 1969	18	88.7	Jul 1998	3+	Dec 1989	24	38.3	Dec 1983	2131	2704	21.3	124.3	351.3	1.2	51.1	.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: 1909-2001

(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	.51	.34	1.41	1994	22	2.12	1992	.00+	1996
Feb	.88	.49	2.30	1975	1	3.22	1989	.00+	1976
Mar	.76	.39	2.94	1998	15	3.24	1999	.00+	1991
Apr	1.25	.96	3.10	1954	22	6.53	1981	.00+	1998
May	1.96	1.75	3.50	1996	31	5.59	1992	.00	1974
Jun	2.08	1.71	16.02	1954	27	9.67	2000	.00	1990
Jul	1.66	1.06	6.04	1948	4	9.75	1976	.00+	1983
Aug	2.32	1.64	3.24	1974	12	9.88	1998	.00+	1977
Sep	3.04	1.95	6.37	1980	26	13.88	1974	.00+	1999
Oct	1.95	1.28	4.08	1983	20	7.74	1983	.00+	1992
Nov	.85	.60	2.70	2001	15	3.14	2000	.00+	1999
Dec	.66	.42	1.36	1982	9	2.54	1991	.00+	1990
Ann	17.92	17.95	16.02	Jun 1954	27	13.88	Sep 1974	.00+	Nov 1999

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	3.1	1.6	.3	.1
Feb	3.2	1.9	.5	.2
Mar	3.0	1.2	.5	.3
Apr	3.2	2.1	.8	.5
May	5.0	3.3	1.3	.5
Jun	4.2	3.0	1.4	.8
Jul	3.6	2.7	.9	.5
Aug	4.4	3.0	1.3	.8
Sep	4.0	3.2	1.7	.9
Oct	4.6	2.8	1.2	.6
Nov	3.1	2.0	.8	.1
Dec	3.5	1.5	.4	.1
Ann	44.9	28.3	11.1	5.4

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	.05	.16	.26	.37	.50	.65	.86	1.20	1.55
Feb	.00	.02	.12	.24	.38	.56	.77	1.06	1.46	2.16	2.86
Mar	.00	.00	.02	.12	.25	.41	.62	.90	1.31	2.01	2.73
Apr	.00	.04	.18	.35	.55	.80	1.10	1.50	2.06	3.04	4.02
May	.10	.27	.56	.85	1.16	1.51	1.91	2.41	3.10	4.24	5.35
Jun	.06	.20	.48	.78	1.11	1.50	1.96	2.54	3.36	4.73	6.09
Jul	.00	.05	.23	.46	.73	1.05	1.46	1.99	2.75	4.07	5.39
Aug	.00	.07	.32	.64	1.01	1.47	2.04	2.79	3.85	5.70	7.56
Sep	.00	.00	.42	.87	1.40	2.01	2.76	3.73	5.06	7.36	9.66
Oct	.00	.00	.18	.44	.76	1.16	1.66	2.33	3.28	4.95	6.64
Nov	.00	.00	.05	.17	.31	.49	.71	1.01	1.45	2.20	2.96
Dec	.00	.00	.05	.13	.24	.37	.54	.77	1.11	1.70	2.30
Ann	10.73	12.03	13.75	15.08	16.29	17.48	18.73	20.12	21.84	24.38	26.62

\+ 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: 1909-2001
(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	.2	.0	#	0
Feb	#	.0	0	0
Mar	.0	.0	0	0
Apr	.0	.0	0	0
May	.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
Dec	#	.0	#	0
Ann	.2	.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	3.0	1986	8	3.0	1986	#+	2000	28	#+	2000
Feb	#	1989	6	#	1989	0	0	0	0	0
Mar	.0	0	0	.0	0	0	0	0	0	0
Apr	.0	0	0	.0	0	0	0	0	0	0
May	.0	0	0	.0	0	#	1989	10	#	1989
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	1.0	2000	8	1.0	2000	#	2000	9	#	2000
Dec	#	1992	15	#+	1992	#+	2000	5	#+	2000
Ann	3.0	Jan 1986	8	3.0	Jan 1986	#+	Dec 2000	5	#+	Dec 2000

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	.1	.1	.1	.0	.0
Feb	.0	.0	.0	.0	.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
Dec	.0	.0	.0	.0	.0
Ann	.1	.1	.1	.0	.0

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	.0	.0	.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	.0	.0	.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	4/16	4/10	4/05	4/02	3/29	3/25	3/22	3/17	3/11
32	4/08	4/01	3/27	3/22	3/18	3/14	3/10	3/05	2/26
28	3/28	3/20	3/13	3/08	3/03	2/26	2/21	2/14	2/06
24	3/10	3/01	2/23	2/18	2/13	2/08	2/03	1/28	1/19
20	2/26	2/15	2/07	2/01	1/26	1/19	1/12	1/03	12/17
16	1/31	1/22	1/14	1/08	1/01	12/23	12/08	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	10/18	10/24	10/29	11/01	11/05	11/08	11/12	11/16	11/22
32	10/27	11/02	11/06	11/09	11/12	11/15	11/19	11/22	11/28
28	11/03	11/10	11/15	11/19	11/23	11/27	12/01	12/06	12/13
24	11/15	11/23	11/28	12/03	12/07	12/12	12/17	12/22	12/30
20	11/25	12/05	12/12	12/19	12/25	12/31	1/07	1/16	2/02
16	12/09	12/19	12/27	1/04	1/12	1/22	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	247	238	231	225	220	215	209	202	193
32	267	257	250	244	238	232	226	219	209
28	298	286	278	271	264	258	251	242	231
24	332	320	311	304	297	290	282	273	261
20	>365	>365	362	342	331	322	313	304	291
16	>365	>365	>365	>365	>365	>365	364	347	334

***** 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	586	396	189	53	6	0	0	0	3	46	294	558	2131
60	432	266	89	14	0	0	0	0	0	11	172	407	1391
57	346	195	49	5	0	0	0	0	0	3	115	322	1035
55	289	155	31	2	0	0	0	0	0	1	84	268	830
50	168	76	7	0	0	0	0	0	0	0	32	154	437
32	1	0	0	0	0	0	0	0	0	0	0	2	3

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	438	530	859	1068	1376	1496	1621	1596	1361	1107	704	467	12623
55	14	40	177	380	663	806	908	883	671	395	98	20	5055
57	8	25	133	323	601	746	846	821	611	335	69	12	4530
60	1	11	80	243	508	656	753	728	521	249	37	4	3791
65	0	1	25	131	359	506	598	573	373	130	8	0	2704
70	0	0	4	56	223	357	443	419	238	51	1	0	1792

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	262	367	644	847	1138	1275	1393	1345	1148	872	496	267	262	629	1273	2120	3258	4533	5926	7271	8419	9291	9787	10054
45	146	240	493	697	983	1125	1238	1190	998	717	359	148	146	386	879	1576	2559	3684	4922	6112	7110	7827	8186	8334
50	62	136	347	547	828	975	1083	1035	848	565	232	64	62	198	545	1092	1920	2895	3978	5013	5861	6426	6658	6722
55	18	65	214	405	673	825	928	880	698	415	133	21	18	83	297	702	1375	2200	3128	4008	4706	5121	5254	5275
60	0	25	111	269	518	675	773	725	549	272	60	2	0	25	136	405	923	1598	2371	3096	3645	3917	3977	3979
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	212	270	428	554	758	856	928	898	766	570	324	205	212	482	910	1464	2222	3078	4006	4904	5670	6240	6564	6769

(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