

Climatology of the United States

No. 20 1971-2000

Station: BOERNE, TX

COOP ID: 410902

Climate Division: TX 6

NWS Call Sign:

Elevation: 1,444 Feet Lat: 29° 48N

Lon: 98° 44W

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	60.0	34.3	47.2	90	1943	23	53.4	1998	-4	1949	31	38.5	1979	556	0	.0	.0	24.4	.4	14.5	.0
Feb	64.7	37.8	51.3	98	1996	22	58.3	2000	-1	1951	2	42.5	1978	390	6	.0	.2	24.5	.5	9.0	.0
Mar	72.0	45.2	58.6	99	1971	29	64.7	1974	14+	1980	2	52.8	1996	221	22	.0	.8	29.9	.0	3.7	.0
Apr	77.9	51.9	64.9	100+	1984	20	69.4	1972	25	1914	8	60.8	1997	74	71	.1	1.4	29.9	.0	.6	.0
May	83.1	61.0	72.1	104	1925	24	76.9	1996	34+	1996	1	67.7	1976	12	230	.0	4.7	31.0	.0	.0	.0
Jun	88.6	67.2	77.9	105+	1980	28	82.4	1990	44	1919	3	75.2	1995	0	387	.3	15.5	30.0	.0	.0	.0
Jul	91.9	69.3	80.6	109	1925	15	83.8	1998	54	1924	2	75.8	1976	0	483	1.3	25.4	31.0	.0	.0	.0
Aug	92.6	68.5	80.6	112	1925	23	82.9	1982	51	1915	31	76.5	1971	0	482	1.3	26.5	31.0	.0	.0	.0
Sep	88.1	63.8	76.0	109	2000	6	80.3	1977	35	1908	30	70.2	1974	1	330	.6	14.8	30.0	.0	.0	.0
Oct	79.7	54.1	66.9	98+	1924	3	70.2	1979	21	1993	31	58.2	1976	55	115	.0	2.3	30.8	.0	.3	.0
Nov	69.2	43.9	56.6	95	1915	4	62.6	1973	14	1938	25	50.0	1976	277	23	.0	@	28.8	@	5.3	.0
Dec	61.6	36.3	49.0	92	1908	17	57.3	1984	0	1929	22	40.0	1989	500	2	.0	.0	26.2	.4	12.7	.0
Ann	77.5	52.8	65.1	112	Aug 1925	23	83.8	Jul 1998	-4	Jan 1949	31	38.5	Jan 1979	2086	2151	3.6	91.6	347.5	1.3	46.1	.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/normal/usnormals.html

Issue Date: February 2004

(1) From the 1971-2000 Monthly Normals

(2) Derived from station's available digital record: 1897-2001

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Precipitation (inches)

		Precipitation Totals								Mean Number of Days (3)				Precipitation Probabilities (1)											
														Probability that the monthly/annual precipitation will be equal to or less than the indicated amount											
Means/Medians(1)		Extremes							Daily Precipitation				Monthly/Annual Precipitation vs Probability Levels												
													These values were determined from the incomplete gamma distribution												
Month	Mean	Median	Highest Daily(2)	Year	Day	Highest Monthly(1)	Year	Lowest Monthly(1)	Year	>= 0.01	>= 0.10	>= 0.50	>= 1.00	.05	.10	.20	.30	.40	.50	.60	.70	.80	.90	.95	
Jan	1.79	1.39	2.92	1938	23	4.71	1989	.03	1996	7.8	4.6	1.1	.2	.11	.22	.44	.68	.96	1.28	1.67	2.17	2.87	4.05	5.22	
Feb	2.24	1.84	4.00	1941	1	7.81	1992	.03	1999	6.3	3.8	1.6	.6	.11	.23	.49	.79	1.13	1.54	2.05	2.70	3.62	5.19	6.77	
Mar	2.57	2.06	4.00	1998	16	6.97	1979	.11	1971	7.9	4.5	1.6	.6	.31	.51	.87	1.23	1.61	2.03	2.52	3.13	3.96	5.33	6.66	
Apr	2.87	2.19	5.42	1976	18	11.11	1976	.00	1983	6.9	4.1	1.7	.8	.24	.55	1.02	1.43	1.87	2.34	2.88	3.54	4.42	5.86	7.23	
May	4.66	5.04	6.86	1958	3	12.61	1992	.76	1998	8.9	5.6	3.0	1.6	.89	1.30	1.99	2.62	3.26	3.95	4.73	5.68	6.93	8.95	10.86	
Jun	4.77	4.01	8.93	1997	22	16.56	1997	.10	1990	7.2	5.1	2.8	1.8	.56	.93	1.60	2.27	2.98	3.77	4.69	5.83	7.38	9.94	12.42	
Jul	2.23	1.02	6.50	1909	22	11.59	1990	.00+	1994	4.4	3.1	1.3	.7	.00	.03	.21	.47	.81	1.25	1.82	2.59	3.72	5.73	7.79	
Aug	3.05	1.90	7.25	2001	27	15.46	1974	.00	1993	5.1	3.7	1.9	.9	.04	.19	.53	.94	1.42	2.00	2.72	3.66	4.99	7.28	9.60	
Sep	3.61	2.98	7.41	1952	10	9.38	1978	.22	1999	7.5	5.3	2.1	1.0	.59	.90	1.43	1.92	2.44	2.99	3.63	4.41	5.45	7.13	8.75	
Oct	4.09	3.36	9.04	1913	2	15.16	2000	.18	1987	7.6	5.0	2.5	1.6	.38	.67	1.23	1.80	2.42	3.12	3.95	4.99	6.42	8.80	11.14	
Nov	3.11	2.72	5.10	1977	1	8.14	2000	.18	1975	7.1	4.4	1.9	.8	.39	.64	1.08	1.51	1.97	2.48	3.07	3.79	4.78	6.40	7.97	
Dec	2.37	1.54	5.68	1991	20	16.96	1991	.00	1999	7.2	4.0	1.3	.5	.04	.18	.47	.79	1.17	1.62	2.16	2.87	3.86	5.56	7.26	
Ann	37.36	39.49	9.04	Oct 1913	2	16.96	Dec 1991	.00+	Dec 1999	83.9	53.2	22.8	11.1	21.24	24.10	27.90	30.89	33.60	36.28	39.10	42.27	46.19	52.02	57.17	

+ 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

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Snow (inches)																							
Snow Totals															Mean Number of Days (1)								
Means/Medians (1)					Extremes (2)										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	4.0	1985	12	4.0	1985	11	1985	13	#+	1985	.2	.1	.1	.0	.0	.0	.0	.0	.0
Feb	.3	.0	#	0	4.0	1973	9	4.0	1973	2	1985	2	#	1985	.1	.1	.1	.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	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Nov	#	.0	#	0	#	1992	5	#+	1992	#	1979	23	#	1979	.0	.0	.0	.0	.0	.0	.0	.0	.0
Dec	#	.0	0	0	#	1990	22	#	1990	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Ann	.5	.0	N/A	N/A	4.0+	Jan 1985	12	4.0+	Jan 1985	11	Jan 1985	13	#+	Feb 1985	.3	.2	.2	.0	.0	.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	4/22	4/16	4/12	4/08	4/04	3/31	3/27	3/23	3/17
32	4/11	4/03	3/29	3/24	3/20	3/15	3/10	3/05	2/25
28	3/28	3/20	3/14	3/09	3/04	2/27	2/22	2/16	2/07
24	3/11	3/01	2/22	2/16	2/10	2/05	1/29	1/22	1/10
20	2/24	2/13	2/04	1/28	1/20	1/12	1/02	12/15	0/00
16	2/07	1/25	1/15	1/05	12/23	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	10/12	10/19	10/23	10/27	10/31	11/04	11/08	11/13	11/20
32	10/27	11/02	11/06	11/09	11/13	11/16	11/20	11/24	11/30
28	11/04	11/11	11/16	11/20	11/24	11/28	12/02	12/07	12/14
24	11/19	11/26	12/01	12/06	12/10	12/15	12/20	12/25	1/03
20	12/03	12/12	12/19	12/25	1/01	1/07	1/17	0/00	0/00
16	12/12	12/24	1/03	1/13	1/25	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	236	227	220	215	210	204	199	192	183
32	268	257	250	243	238	232	225	218	207
28	296	285	278	271	264	258	251	243	233
24	352	331	320	311	303	296	288	278	266
20	>365	>365	>365	365	346	334	324	314	302
16	>365	>365	>365	>365	>365	>365	>365	346	327

* 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
65	556	390	221	74	12	0	0	0	1	55	277	500	2086
60	412	264	117	20	1	0	0	0	0	16	168	357	1355
57	331	198	71	7	0	0	0	0	0	6	117	276	1006
55	280	160	48	3	0	0	0	0	0	3	89	228	811
50	177	85	14	0	0	0	0	0	0	0	37	132	445
32	9	0	0	0	0	0	0	0	0	0	0	1	10

Cooling Degree Days (1)

Base	Cooling Degree Days (1)												
	Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
32	478	540	823	987	1242	1377	1506	1505	1319	1083	736	526	12122
55	36	56	158	300	529	687	793	792	629	373	135	40	4528
57	25	37	120	244	467	627	731	730	569	314	103	26	3993
60	14	19	72	167	375	537	638	637	479	231	64	13	3246
65	0	6	22	71	230	387	483	482	330	115	23	2	2151
70	0	0	4	18	114	240	328	327	191	40	6	0	1268

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	276	366	593	767	1012	1158	1280	1274	1093	851	514	320	276	642	1235	2002	3014	4172	5452	6726	7819	8670	9184	9504
45	170	244	446	617	857	1008	1125	1119	943	696	377	199	170	414	860	1477	2334	3342	4467	5586	6529	7225	7602	7801
50	89	145	308	469	702	858	970	964	793	544	254	114	89	234	542	1011	1713	2571	3541	4505	5298	5842	6096	6210
55	38	77	188	328	547	708	815	809	643	394	152	53	38	115	303	631	1178	1886	2701	3510	4153	4547	4699	4752
60	10	32	99	197	393	558	660	654	495	257	77	17	10	42	141	338	731	1289	1949	2603	3098	3355	3432	3449
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	201	249	393	505	687	796	864	852	737	570	338	219	201	450	843	1348	2035	2831	3695	4547	5284	5854	6192	6411

(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.
Complete documentation for the 1971-2000 Normals is available on the internet from:
www.ncdc.noaa.gov/oa/climate/normal/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/normal.html
U.S. Climate Normals 1971-2000-Products Clim20, www.ncdc.noaa.gov/oa/climate/normal/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