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: SUNSET CRATER NATL MNMNT, AZ **COOP ID: 028329**

Climate Division: AZ 2 **NWS Call Sign:** **Elevation: 6,980 Feet** **Lat: 35˚22N** **Lon: 111˚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	43.1	11.8	27.5	68	1971	20	33.9	1999	-26	1971	7	20.6	1989	1164	0	.0	.0	8.4	3.2	30.3	4.2
Feb	46.5	15.3	30.9	70	1986	26	37.1	1995	-28	1985	1	26.9	1985	954	0	.0	.0	11.4	1.9	27.7	1.5
Mar	52.0	20.0	36.0	74	1971	24	42.5	1989	-9	1987	1	29.2	1973	899	0	.0	.0	19.9	.4	28.8	.4
Apr	60.5	25.5	43.0	82	1996	27	49.5	1989	-1+	1980	1	37.5	1998	660	0	.0	.0	25.9	.1	23.6	.1
May	69.9	33.0	51.5	90+	2000	29	58.1	1996	12+	1988	7	46.8	1977	423	3	.0	.1	30.6	.0	16.0	.0
Jun	81.2	40.2	60.7	99+	1994	26	67.2	1994	21+	1995	18	57.0	1991	161	32	.0	4.1	30.0	.0	5.9	.0
Jul	84.2	47.4	65.8	98+	1995	29	68.2+	1996	27+	1987	2	62.6	1987	35	59	.0	6.3	31.0	.0	.3	.0
Aug	81.1	46.0	63.6	97	1994	5	67.3	1995	27	1976	5	61.4	1976	74	28	.0	1.7	31.0	.0	.5	.0
Sep	75.2	39.0	57.1	91+	1995	5	60.1	1983	12	1978	21	54.1	1988	241	3	.0	.2	29.9	.0	6.0	.0
Oct	64.0	27.2	45.6	85+	1980	4	49.9	1988	2	1971	30	40.9	1971	601	0	.0	.0	28.3	.1	24.0	.0
Nov	51.4	17.9	34.7	74	1980	8	39.2	1995	-12	1976	28	28.6	2000	912	0	.0	.0	17.8	.4	28.0	.6
Dec	43.9	11.7	27.8	68	1977	6	35.1	1980	-25	1990	23	20.6	1990	1153	0	.0	.0	9.9	3.3	30.1	3.7
Ann	62.8	27.9	45.4	99+	Jun 1994	26	68.2+	Jul 1996	-28	Feb 1985	1	20.6+	Dec 1990	7277	125	.0	12.4	274.1	9.4	221.2	10.5

\+ 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: 1969-2001

(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	1.24	1.11	1.50	1990	3	5.12	1993	.00	1972
Feb	1.30	1.19	1.24	1987	24	3.71	1980	.06	1972
Mar	1.33	1.26	1.34	1973	12	3.92	1991	.00+	1997
Apr	.79	.67	1.10	1999	23	2.84	1999	.00+	1993
May	.72	.47	1.82	1992	27	5.00	1992	.00+	1996
Jun	.49	.20	1.60	1988	27	3.43	1988	.00+	1998
Jul	2.42	2.01	1.97	1997	23	6.01	1981	.00	1993
Aug	2.80	2.83	1.30	1982	1	5.10	2000	.46	1976
Sep	1.93	1.47	2.24	1998	5	6.75	1990	.00	1973
Oct	1.39	1.07	2.00	1972	4	8.90	1972	.00+	1999
Nov	1.27	.98	2.43	1978	11	6.08	1978	.00+	1999
Dec	1.38	.99	2.50	1992	5	7.17	1992	.00	1973
Ann	17.06	16.43	2.50	Dec 1992	5	8.90	Oct 1972	.00+	Nov 1999

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	5.9	3.2	.6	.1
Feb	5.7	3.5	.7	.2
Mar	6.6	3.8	.6	.2
Apr	4.4	2.1	.4	.1
May	4.8	2.0	.3	@
Jun	3.0	1.3	.2	@
Jul	10.5	5.8	1.4	.4
Aug	12.6	7.1	1.7	.2
Sep	7.8	4.6	1.1	.4
Oct	5.6	3.2	.8	.2
Nov	4.4	2.8	.7	.3
Dec	5.5	3.3	.8	.1
Ann	76.8	42.7	9.3	2.2

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	.08	.23	.40	.60	.83	1.12	1.49	2.02	2.93	3.85
Feb	.13	.22	.40	.58	.78	1.00	1.26	1.59	2.03	2.77	3.50
Mar	.00	.13	.36	.57	.78	1.03	1.31	1.65	2.12	2.90	3.65
Apr	.00	.07	.21	.33	.46	.61	.78	.98	1.27	1.74	2.20
May	.00	.00	.07	.16	.28	.42	.61	.85	1.21	1.82	2.45
Jun	.00	.00	.00	.01	.06	.16	.31	.51	.83	1.42	2.03
Jul	.43	.76	1.17	1.50	1.82	2.16	2.53	2.97	3.54	4.44	5.28
Aug	.73	1.00	1.40	1.76	2.11	2.48	2.89	3.38	4.02	5.02	5.96
Sep	.03	.14	.37	.64	.95	1.31	1.76	2.33	3.15	4.54	5.94
Oct	.00	.09	.31	.52	.75	1.02	1.33	1.72	2.26	3.16	4.05
Nov	.00	.00	.23	.43	.65	.90	1.20	1.58	2.08	2.94	3.79
Dec	.04	.14	.33	.53	.75	1.00	1.30	1.69	2.21	3.10	3.98
Ann	10.80	11.96	13.47	14.64	15.68	16.71	17.78	18.97	20.43	22.58	24.46

\+ 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: 1969-2001
(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	12.2	8.0	5	4
Feb	10.5	8.0	4	2
Mar	10.3	5.0	2	#
Apr	4.8	2.5	1	#
May	.1	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.0	.0	0	0
Oct	1.8	.0	#	0
Nov	7.0	5.9	1	#
Dec	10.8	8.6	3	2
Ann	57.5	38.0	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	21.0	1997	13	45.5	1997	28	1987	20	15	1992
Feb	25.5	1987	24	39.6	1987	28	1987	24	15	1973
Mar	26.0	1975	15	44.2	1975	31	1973	14	20	1973
Apr	11.0	1985	26	26.8	1999	23	1973	3	9	1973
May	.8	1986	7	.8+	1999	1	1990	2	#+	2000
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	.2	1986	24	.2	1986	0	0	0	0	0
Oct	8.0	1996	27	11.0	1996	9	1996	27	#+	2000
Nov	14.0	1993	15	22.2	1985	12+	1991	30	3	1985
Dec	28.0	1987	14	31.1	1984	27	1987	26	12	1991
Ann	28.0	Dec 1987	14	45.5	Jan 1997	31	Mar 1973	14	20	Mar 1973

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	4.3	3.5	1.6	.7	.2
Feb	3.9	2.9	1.5	.7	.2
Mar	3.4	2.4	1.1	.6	.2
Apr	1.9	1.3	.4	.2	.1
May	.2	.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
Oct	.8	.5	.3	.1	.0
Nov	2.4	1.7	.8	.5	.1
Dec	3.9	2.5	1.4	.9	.3
Ann	20.8	14.8	7.1	3.7	1.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	20.5	13.6	8.9	4.9
Feb	12.2	7.6	5.5	2.5
Mar	5.3	2.8	1.6	.8
Apr	1.1	.7	.4	.1
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	.4	.1	.1	.0
Nov	3.9	1.6	.8	.2
Dec	13.0	9.2	5.5	1.8
Ann	56.4	35.6	22.8	10.3

+ 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	7/20	7/15	7/11	7/07	7/04	7/01	6/28	6/24	6/18
32	7/02	6/28	6/25	6/23	6/21	6/19	6/17	6/14	6/11
28	6/28	6/22	6/18	6/15	6/12	6/09	6/06	6/02	5/27
24	6/08	6/03	5/30	5/26	5/23	5/20	5/16	5/12	5/06
20	5/28	5/22	5/18	5/15	5/12	5/09	5/05	5/01	4/26
16	5/16	5/08	5/02	4/26	4/22	4/17	4/11	4/05	3/28

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	8/12	8/18	8/23	8/26	8/30	9/02	9/06	9/10	9/16
32	8/20	8/27	9/01	9/05	9/09	9/13	9/17	9/21	9/28
28	9/02	9/09	9/13	9/17	9/21	9/25	9/29	10/03	10/10
24	9/19	9/24	9/28	10/01	10/04	10/07	10/10	10/14	10/19
20	9/28	10/03	10/07	10/10	10/13	10/16	10/19	10/23	10/28
16	10/06	10/12	10/16	10/20	10/23	10/27	10/30	11/03	11/09

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	80	71	65	60	56	51	46	40	32
32	103	95	89	84	79	74	69	63	55
28	128	118	112	106	100	95	89	82	72
24	156	148	143	138	133	129	124	118	110
20	172	166	161	157	154	150	146	141	135
16	217	206	197	190	184	177	170	162	151

***** 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	1164	954	899	660	423	161	35	74	241	601	912	1153	7277
60	1009	814	744	510	282	74	3	12	117	447	762	998	5772
57	916	730	651	422	208	41	0	2	64	356	672	905	4967
55	854	674	589	365	164	25	0	0	40	299	612	843	4465
50	699	534	439	233	80	6	0	0	8	172	462	688	3321
32	194	91	54	8	0	0	0	0	0	1	46	193	587

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	53	61	177	338	603	862	1047	977	752	424	124	64	5482
55	0	0	0	5	54	197	334	264	102	8	0	0	964
57	0	0	0	2	36	152	272	204	66	4	0	0	736
60	0	0	0	0	17	96	181	121	29	1	0	0	445
65	0	0	0	0	3	32	59	28	3	0	0	0	125
70	0	0	0	0	0	6	6	1	0	0	0	0	13

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	5	10	49	164	376	635	811	748	526	229	37	4	5	15	64	228	604	1239	2050	2798	3324	3553	3590	3594
45	0	0	11	74	237	485	656	593	376	114	6	0	0	0	11	85	322	807	1463	2056	2432	2546	2552	2552
50	0	0	0	25	119	340	501	438	237	38	0	0	0	0	0	25	144	484	985	1423	1660	1698	1698	1698
55	0	0	0	3	49	205	346	283	113	6	0	0	0	0	0	3	52	257	603	886	999	1005	1005	1005
60	0	0	0	0	14	100	197	138	33	0	0	0	0	0	0	0	14	114	311	449	482	482	482	482
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	25	40	93	188	326	477	536	500	392	239	82	27	25	65	158	346	672	1149	1685	2185	2577	2816	2898	2925

(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