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: BRIGHT ANGEL R S, AZ **COOP ID: 021001**

Climate Division: AZ 2 **NWS Call Sign:** **Elevation: 8,400 Feet** **Lat: 36˚13N** **Lon: 112˚04W**

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	38.4	16.0	27.2	63+	1975	18	34.2	1986	-18	1979	30	19.3	1979	1172	0	.0	.0	2.8	7.8	30.7	1.3
Feb	40.4	17.2	28.8	64	1957	14	34.5	1995	-23	1985	1	24.2	1979	1014	0	.0	.0	3.5	4.9	28.1	.6
Mar	44.4	20.8	32.6	65	1997	21	39.8	1972	-4	1975	28	26.1	1973	1004	0	.0	.0	8.0	2.0	29.8	.2
Apr	51.9	26.3	39.1	74+	2000	27	47.4	1989	3	1975	2	31.9	1975	776	0	.0	.0	19.5	.7	25.0	.0
May	61.5	33.1	47.3	83+	2000	31	54.2	2000	12	1978	6	41.9	1980	549	0	.0	.0	28.3	.0	14.9	.0
Jun	73.2	40.5	56.9	89	1968	22	61.4	1974	22	1999	2	53.5	1995	253	9	.0	.0	30.0	.0	3.5	.0
Jul	77.0	46.6	61.8	92	2000	29	66.8	1972	27	1971	11	59.2	1986	121	23	.0	.2	31.0	.0	.2	.0
Aug	74.4	45.9	60.2	90+	1986	4	63.8	1996	24	1968	24	57.9+	1979	160	9	.0	@	31.0	.0	.1	.0
Sep	68.0	39.9	54.0	88	1950	4	57.4	2000	22	1978	20	48.2	1986	333	0	.0	.0	29.8	.0	3.6	.0
Oct	57.0	30.5	43.8	82	1973	16	48.4	1988	6	1949	21	37.4	1984	660	0	.0	.0	25.3	.4	19.7	.0
Nov	45.2	22.3	33.8	66	1949	4	40.8	1995	-2	1976	28	27.1	2000	939	0	.0	.0	10.1	2.5	28.0	.1
Dec	39.7	16.6	28.2	68	1981	7	33.5	1980	-22	1978	8	23.0	1974	1143	0	.0	.0	3.8	5.0	30.7	1.0
Ann	55.9	29.6	42.8	92	Jul 2000	29	66.8	Jul 1972	-23	Feb 1985	1	19.3	Jan 1979	8124	41	.0	.2	223.1	23.3	214.3	3.2

\+ 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

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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	3.73	2.60	3.60	1952	7	12.49	1993	.03	1972
Feb	3.42	3.37	3.50	1995	14	10.01	1980	.00	1972
Mar	3.64	2.96	3.99	1991	1	9.55	1991	.00	1997
Apr	1.47	1.19	1.70	1958	3	5.37	1995	.00	1989
May	.87	.80	1.70	1962	28	2.39	1992	.00+	1974
Jun	.46	.21	2.38	1955	13	2.41	1988	.00+	1996
Jul	1.83	1.67	2.02	1983	25	4.49	1983	.00	1993
Aug	2.17	1.81	4.25	1951	29	5.89	1988	.06	1974
Sep	1.76	1.49	2.05	1997	26	9.55	1997	.00	1971
Oct	2.04	1.67	3.13	1992	31	8.06	1972	.01	1999
Nov	1.84	1.60	2.48	1985	12	6.84	1985	.00+	1999
Dec	2.47	2.06	5.06	1951	30	8.52	1978	.42	1999
Ann	25.70	22.73	5.06	Dec 1951	30	12.49	Jan 1993	.00+	Nov 1999

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	7.9	6.1	2.8	1.0
Feb	7.2	5.7	2.5	.9
Mar	8.1	6.1	2.2	.6
Apr	4.7	3.2	1.1	.2
May	4.5	2.4	.5	@
Jun	2.7	1.4	.2	.0
Jul	7.9	4.3	1.0	.3
Aug	9.2	4.9	1.0	.5
Sep	7.1	3.6	1.1	.3
Oct	5.7	3.7	1.2	.4
Nov	4.4	2.9	1.1	.3
Dec	6.3	4.3	1.5	.4
Ann	75.7	48.6	16.2	4.9

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	.19	.39	.83	1.33	1.90	2.58	3.41	4.48	6.00	8.58	11.16
Feb	.25	.61	1.16	1.66	2.18	2.76	3.41	4.22	5.30	7.07	8.77
Mar	.09	.33	.81	1.32	1.90	2.58	3.39	4.43	5.88	8.34	10.78
Apr	.04	.15	.35	.56	.79	1.06	1.38	1.79	2.36	3.30	4.24
May	.00	.06	.20	.33	.48	.64	.84	1.08	1.41	1.97	2.52
Jun	.00	.00	.02	.08	.16	.25	.37	.54	.78	1.19	1.62
Jul	.22	.44	.75	1.01	1.28	1.56	1.88	2.26	2.76	3.56	4.32
Aug	.23	.39	.69	.99	1.32	1.69	2.12	2.65	3.38	4.60	5.78
Sep	.03	.12	.32	.56	.84	1.18	1.59	2.12	2.88	4.18	5.48
Oct	.10	.20	.44	.71	1.02	1.39	1.85	2.45	3.29	4.73	6.18
Nov	.00	.12	.40	.69	.99	1.34	1.76	2.27	2.99	4.18	5.36
Dec	.30	.50	.85	1.19	1.56	1.96	2.44	3.02	3.82	5.12	6.39
Ann	14.36	16.36	19.02	21.11	23.02	24.91	26.89	29.13	31.90	36.02	39.67

\+ 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	37.8	26.3	25	25	28.0	1975	9	88.5	1993	77	1979	29	55	1979	8.3	7.2	4.4	2.8	.8	27.8	27.4	26.5	24.6
Feb	24.4	26.6	33	31	19.5	1990	19	46.0	1978	89	1993	28	76	1993	6.7	6.0	3.6	2.2	.5	-9.9	-9.9	-9.9	-9.9
Mar	31.6	34.0	29	23	20.0	1991	1	75.0	1991	86	1993	1	70	1979	6.9	6.1	3.7	2.2	.5	-9.9	-9.9	-9.9	-9.9
Apr	11.8	7.0	15	3	14.5	1995	21	52.0	1995	81	1979	3	62	1979	3.7	3.2	1.4	.9	.2	6.1	4.9	3.7	1.6
May	2.7	1.5	2	#	8.0	1986	7	12.0	1977	50	1983	1	17	1983	.8	.6	.3	.1	.0	1.2	1.0	.8	.5
Jun	.2	.0	#	0	3.0	1999	4	5.0	1999	#	1995	8	#	1995	.1	.1	@	.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	2.5	.3	#	#	14.0	1994	15	19.0	1974	18	1974	29	2	1996	1.3	.8	.5	.2	.1	1.0	.8	.7	.2
Nov	13.9	14.8	4	3	18.0	1985	12	48.8	1985	31	1978	15	16	1978	3.9	3.2	2.0	1.1	.2	8.6	6.4	4.6	2.8
Dec	21.6	19.3	12	11	21.0	1982	1	56.0	1978	49	1982	1	40+	1982	5.8	4.8	2.9	1.4	.3	22.1	19.9	17.2	10.5
Ann	146.5	129.8	N/A	N/A	28.0	Jan 1975	9	88.5	Jan 1993	89	Feb 1993	28	76	Feb 1993	37.5	32.0	18.8	10.9	2.6	-9.9	-9.9	-9.9	-9.9

+ 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	7/14	7/08	7/04	7/01	6/28	6/25	6/21	6/17	6/12
32	7/03	6/27	6/22	6/18	6/15	6/11	6/07	6/03	5/28
28	6/19	6/12	6/06	6/02	5/29	5/24	5/20	5/14	5/07
24	5/31	5/24	5/19	5/15	5/11	5/07	5/03	4/28	4/22
20	5/17	5/09	5/03	4/28	4/23	4/18	4/13	4/07	3/30
16	5/06	4/27	4/21	4/16	4/11	4/06	4/01	3/26	3/17

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	8/13	8/20	8/26	8/30	9/03	9/07	9/11	9/17	9/24
32	8/31	9/06	9/11	9/14	9/18	9/21	9/25	9/29	10/05
28	9/19	9/24	9/28	10/01	10/04	10/07	10/10	10/14	10/20
24	9/30	10/07	10/11	10/15	10/19	10/22	10/26	10/31	11/06
20	10/13	10/19	10/23	10/27	10/30	11/03	11/06	11/10	11/16
16	10/21	10/27	11/01	11/04	11/08	11/11	11/15	11/19	11/25

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	97	87	79	73	66	60	54	46	36
32	121	112	105	99	94	89	83	77	68
28	156	147	139	133	128	122	116	109	99
24	184	176	170	165	160	155	150	143	135
20	220	210	202	195	189	183	177	169	159
16	245	233	224	217	210	203	195	187	175

***** 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	1172	1014	1004	776	549	253	121	160	333	660	939	1143	8124
60	1017	874	849	626	401	135	37	54	190	505	789	988	6465
57	924	790	756	537	317	83	12	19	119	413	699	895	5564
55	862	734	694	479	265	57	5	8	81	354	639	833	5011
50	707	594	541	340	156	17	0	0	23	220	490	678	3766
32	186	132	109	32	4	0	0	0	0	7	82	173	725

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	37	42	128	246	478	746	925	872	657	371	133	53	4688
55	0	0	0	2	26	113	217	167	48	5	0	0	578
57	0	0	0	1	16	79	162	116	26	2	0	0	402
60	0	0	0	0	7	41	94	58	7	0	0	0	207
65	0	0	0	0	0	9	23	9	0	0	0	0	41
70	0	0	0	0	0	0	3	0	0	0	0	0	3

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	0	0	10	78	251	510	684	631	425	166	18	0	0	0	10	88	339	849	1533	2164	2589	2755	2773	2773
45	0	0	0	23	132	361	529	476	281	69	0	0	0	0	0	23	155	516	1045	1521	1802	1871	1871	1871
50	0	0	0	3	48	219	374	321	148	18	0	0	0	0	0	3	51	270	644	965	1113	1131	1131	1131
55	0	0	0	0	10	107	221	173	50	1	0	0	0	0	0	0	10	117	338	511	561	562	562	562
60	0	0	0	0	0	35	86	55	6	0	0	0	0	0	0	0	0	35	121	176	182	182	182	182
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	1	19	73	191	358	440	395	282	139	27	3	0	1	20	93	284	642	1082	1477	1759	1898	1925	1928

(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