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: RICHMOND, CA **COOP ID: 047414**

Climate Division: CA 4 **NWS Call Sign:** **Elevation: 20 Feet** **Lat: 37˚37N** **Lon: 122˚22W**

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	57.1	42.9	50.0	76	1962	9	54.6	1995	27	1982	7	45.8	1982	464	0	.0	.0	29.8	.0	.5	.0
Feb	60.9	45.4	53.2	88	1981	22	57.0	1992	28	1956	16	47.9	1989	332	0	.0	.0	27.7	.0	.1	.0
Mar	63.2	46.8	55.0	84+	1972	16	58.2	1993	33	1951	3	51.2	1999	311	1	.0	.0	31.0	.0	.0	.0
Apr	66.3	48.4	57.4	93+	1989	8	61.7	1992	31	1976	11	51.7	1975	234	5	.0	.2	30.0	.0	@	.0
May	68.3	50.9	59.6	100	1976	12	64.0	1997	38	1977	16	56.2	1971	181	13	@	.4	31.0	.0	.0	.0
Jun	70.7	53.6	62.2	106	2000	14	66.9	1993	43	1975	19	59.0	1975	111	26	.1	1.1	30.0	.0	.0	.0
Jul	70.5	54.9	62.7	98	1970	3	66.5	1995	44	1984	22	60.1	1971	93	23	.0	.4	31.0	.0	.0	.0
Aug	71.0	55.9	63.5	98+	1993	1	65.8	1997	44	1983	14	59.8	1973	71	23	.0	.2	31.0	.0	.0	.0
Sep	73.4	56.1	64.8	107+	1971	15	69.4	1984	46+	1983	2	61.6	1986	71	63	.2	1.5	30.0	.0	.0	.0
Oct	71.8	53.1	62.5	100	1980	2	65.7	1995	41+	1971	19	57.3	1971	107	27	@	.7	31.0	.0	.0	.0
Nov	63.6	47.6	55.6	86+	1966	2	59.9	1995	34+	1985	14	51.2	1994	285	3	.0	.0	30.0	.0	.0	.0
Dec	57.3	43.0	50.2	83	1979	3	54.1	1995	24+	1990	22	44.9	1972	460	0	.0	.0	29.4	.0	.8	.0
Ann	66.2	49.9	58.1	107+	Sep 1971	15	69.4	Sep 1984	24+	Dec 1990	22	44.9	Dec 1972	2720	184	.3	4.5	361.9	.0	1.4	.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: 1950-2001

(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	4.91	3.83	6.83	1982	4	11.68	1973	.30	1984
Feb	4.41	4.09	3.37	1998	3	16.40	1998	.17	1995
Mar	3.52	2.42	1.91	1995	9	12.24	1983	.01	1988
Apr	1.35	1.08	2.32	1953	27	4.98	1982	.10+	1987
May	.54	.11	2.05	1996	16	3.74	1998	.00+	1999
Jun	.17	.02	1.42	1993	4	1.46	1993	.00+	1996
Jul	.07	.00	1.23	1974	8	1.41	1974	.00+	2000
Aug	.09	.00	1.00	1997	20	1.10	1997	.00+	2000
Sep	.27	.07	2.05	1959	18	1.65	1989	.00+	1997
Oct	1.25	1.17	3.29	1962	12	4.57	1972	.00+	1995
Nov	3.47	2.42	2.70	1977	21	10.55	1973	.12+	1995
Dec	3.30	2.80	3.90	1969	20	9.71	1996	.00	1989
Ann	23.35	20.07	6.83	Jan 1982	4	16.40	Feb 1998	.00+	Aug 2000

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	10.3	7.1	3.3	1.5
Feb	10.0	7.3	3.1	1.1
Mar	9.9	7.0	2.6	.6
Apr	5.2	3.4	.7	.2
May	2.6	1.3	.3	.1
Jun	.8	.5	.1	@
Jul	.3	.2	@	@
Aug	.5	.3	@	@
Sep	1.7	.8	.1	@
Oct	3.5	2.1	1.1	.5
Nov	7.8	5.5	2.4	.8
Dec	8.6	6.1	2.4	.8
Ann	61.2	41.6	16.1	5.6

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	.40	.73	1.37	2.05	2.80	3.66	4.68	5.98	7.76	10.75	13.70
Feb	.27	.54	1.08	1.68	2.36	3.15	4.11	5.34	7.05	9.96	12.86
Mar	.17	.36	.77	1.24	1.78	2.42	3.21	4.23	5.67	8.13	10.60
Apr	.09	.18	.35	.53	.74	.98	1.27	1.63	2.14	3.00	3.85
May	.00	.00	.00	.01	.04	.13	.27	.50	.88	1.57	2.39
Jun	.00	.00	.00	.00	.00	.01	.06	.14	.28	.55	.85
Jul	.00	.00	.00	.00	.00	.00	.00	.00	.00	.17	.47
Aug	.00	.00	.00	.00	.00	.00	.00	.00	.01	.24	.58
Sep	.00	.00	.00	.00	.01	.07	.16	.28	.47	.82	1.18
Oct	.00	.06	.22	.41	.62	.86	1.15	1.53	2.06	2.95	3.84
Nov	.13	.29	.67	1.12	1.65	2.29	3.09	4.14	5.63	8.21	10.81
Dec	.33	.72	1.27	1.74	2.23	2.76	3.35	4.08	5.03	6.58	8.06
Ann	10.10	12.21	15.14	17.54	19.79	22.05	24.49	27.28	30.81	36.18	41.04

\+ 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: 1950-2001
(3) Derived from 1971-2000 serially complete daily data

Complete documentation available from:
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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	.0	.0	0	0
Feb	#	.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	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	.0	0	0	.0	0	0	0	0	0	0
Feb	#	1976	5	#	1976	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	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	.0	0	0	.0	0	0	0	0	0	0
Dec	.0	0	0	.0	0	0	0	0	0	0
Ann	#	Feb 1976	5	#	Feb 1976	0	0	0	0	0

Mean Number of Days (1)

Snow Fall >= Thresholds

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

(1) Derived from Snow Climatology and 1971-2000 daily data

@ Denotes mean number of days greater than 0 but less than .05

(2) Derived from 1971-2000 daily data

-9/-9.9 represents missing values

Annual statistics for Mean/Median snow depths are not appropriate

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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	3/12	2/28	2/19	2/12	2/05	1/28	1/19	1/08	0/00
32	2/10	1/25	1/11	12/26	0/00	0/00	0/00	0/00	0/00
28	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00
24	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00
20	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00
16	0/00	0/00	0/00	0/00	0/00	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	11/21	11/30	12/07	12/13	12/19	12/24	12/31	1/09	0/00
32	12/20	12/31	1/10	1/22	0/00	0/00	0/00	0/00	0/00
28	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00
24	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00
20	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00
16	0/00	0/00	0/00	0/00	0/00	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	>365	>365	355	334	320	308	295	282	264
32	>365	>365	>365	>365	>365	>365	>365	>365	332
28	>365	>365	>365	>365	>365	>365	>365	>365	>365
24	>365	>365	>365	>365	>365	>365	>365	>365	>365
20	>365	>365	>365	>365	>365	>365	>365	>365	>365
16	>365	>365	>365	>365	>365	>365	>365	>365	>365

***** 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	464	332	311	234	181	111	93	71	71	107	285	460	2720
60	310	198	171	111	76	33	19	8	15	28	156	309	1434
57	224	128	105	61	34	11	5	0	5	8	96	224	901
55	171	91	72	34	17	5	1	0	0	3	66	173	633
50	72	26	16	6	2	0	0	0	0	0	18	77	217
32	0	0	0	0	0	0	0	0	0	0	0	0	0

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	559	592	713	761	855	905	953	974	982	943	708	563	9508
55	17	39	71	105	160	220	241	261	292	233	84	23	1746
57	8	20	43	71	115	166	182	200	237	176	54	12	1284
60	1	7	16	31	63	98	104	114	158	103	24	4	723
65	0	0	1	5	13	26	23	23	63	27	3	0	184
70	0	0	0	0	0	4	1	1	13	3	0	0	22

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	326	402	491	552	645	704	738	760	771	717	484	338	326	728	1219	1771	2416	3120	3858	4618	5389	6106	6590	6928
45	181	259	336	402	490	554	583	605	621	562	334	190	181	440	776	1178	1668	2222	2805	3410	4031	4593	4927	5117
50	63	124	186	253	335	404	428	450	471	407	190	74	63	187	373	626	961	1365	1793	2243	2714	3121	3311	3385
55	10	38	66	118	184	254	273	295	321	253	76	11	10	48	114	232	416	670	943	1238	1559	1812	1888	1899
60	0	0	10	36	64	114	122	141	171	113	17	0	0	0	10	46	110	224	346	487	658	771	788	788
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	134	186	236	281	345	400	426	449	461	412	235	141	134	320	556	837	1182	1582	2008	2457	2918	3330	3565	3706

(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