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: IMPERIAL MUNICIPAL AP, NE **COOP ID: 254110**

Climate Division: NE 7 **NWS Call Sign:** **Elevation: 3,278 Feet** **Lat: 40˚31N** **Lon: 101˚39W**

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	37.6	12.3	25.0	74	1967	22	34.3	1986	-22	1984	18	12.7	1979	1242	0	.0	.0	7.2	9.0	30.4	4.4
Feb	43.9	16.8	30.4	78+	1982	22	38.4	1999	-22+	1982	5	19.1	1978	971	0	.0	.0	12.3	5.6	26.6	2.3
Mar	51.8	23.8	37.8	89	1967	29	43.9	1986	-24	1960	3	32.0	1980	844	0	.0	.0	19.5	2.5	24.0	.5
Apr	61.8	33.3	47.6	95+	1992	30	54.2	1981	6+	1975	2	41.1	1983	525	1	.0	.3	25.8	.3	11.8	.0
May	71.7	46.1	58.9	98	1994	30	64.5	1994	22+	1989	2	52.0	1995	219	30	.0	1.0	30.6	.0	1.0	.0
Jun	82.4	56.1	69.3	107	1963	29	74.2	1988	33	1951	2	63.7	1982	35	163	.8	8.6	29.9	.0	.0	.0
Jul	88.6	61.6	75.1	107+	1990	1	78.5	1980	40	1952	8	70.4	1992	1	314	2.2	17.2	31.0	.0	.0	.0
Aug	86.4	58.9	72.7	104+	1985	31	78.6	1983	41+	1993	31	67.6	1992	13	249	.9	14.0	31.0	.0	.0	.0
Sep	78.4	48.7	63.6	106	1948	1	70.0	1998	20	1985	30	59.6	1993	117	73	.2	5.7	29.5	.0	.8	.0
Oct	66.3	35.2	50.8	94	1975	12	54.1	1974	6+	1997	27	46.7	1976	442	0	.0	.4	28.4	.2	8.3	.0
Nov	48.6	22.3	35.5	83	1980	6	44.6	1999	-11	1950	24	25.9	1985	886	0	.0	.0	15.8	3.2	25.1	.4
Dec	39.8	14.2	27.0	74	1980	27	34.5	1999	-34	1989	22	11.7	1983	1177	0	.0	.0	8.3	7.3	30.2	2.8
Ann	63.1	35.8	49.5	107+	Jul 1990	1	78.6	Aug 1983	-34	Dec 1989	22	11.7	Dec 1983	6472	830	4.1	47.2	269.3	28.1	158.2	10.4

\+ 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

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	.52	.40	.90	1988	19	1.57	1988	.00	1986
Feb	.53	.37	.79	1979	27	2.17	1993	.01	1996
Mar	1.42	1.05	2.06	1983	5	6.15	1981	.18	1997
Apr	1.94	1.58	4.58	1971	19	6.73	1971	.10	1992
May	3.25	3.10	2.54	1951	15	7.55	1982	.46	1992
Jun	3.02	2.78	2.96	1962	30	5.80+	1997	.63	1985
Jul	2.83	2.43	2.75	1958	18	6.97	1993	.50	1999
Aug	2.56	2.31	2.95	1999	29	8.60	1999	.12	1995
Sep	1.34	1.05	2.61	1973	28	6.35	1973	.00	1983
Oct	1.24	1.05	2.30	1985	18	4.01	2000	.05	1989
Nov	.77	.58	1.14	1975	19	1.96	1972	.00	1989
Dec	.43	.30	.62	1991	12	1.25	1982	.00	1980
Ann	19.85	19.22	4.58	Apr 1971	19	8.60	Aug 1999	.00+	Nov 1989

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	3.1	1.7	.2	.0
Feb	3.7	1.5	.2	.0
Mar	5.6	3.4	.8	.2
Apr	6.7	4.0	1.2	.2
May	8.8	6.1	2.0	.9
Jun	7.9	5.9	2.2	.5
Jul	7.4	5.6	1.8	.6
Aug	6.2	4.4	1.7	.8
Sep	4.2	2.7	.9	.3
Oct	4.2	2.8	.9	.2
Nov	3.6	2.1	.4	.1
Dec	2.9	1.3	.1	.0
Ann	64.3	41.5	12.4	3.8

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	.04	.09	.17	.25	.33	.42	.52	.64	.80	1.07	1.33
Feb	.03	.06	.12	.19	.28	.37	.49	.64	.84	1.20	1.56
Mar	.15	.25	.45	.65	.86	1.10	1.38	1.74	2.22	3.01	3.79
Apr	.35	.52	.80	1.06	1.34	1.63	1.96	2.36	2.90	3.77	4.59
May	.89	1.20	1.67	2.08	2.48	2.90	3.37	3.92	4.64	5.76	6.82
Jun	.83	1.12	1.55	1.93	2.31	2.70	3.13	3.64	4.31	5.36	6.33
Jul	.87	1.14	1.54	1.88	2.22	2.56	2.94	3.38	3.96	4.85	5.68
Aug	.36	.57	.93	1.29	1.66	2.07	2.54	3.12	3.91	5.19	6.42
Sep	.04	.15	.33	.53	.74	.99	1.28	1.65	2.16	3.01	3.85
Oct	.06	.12	.26	.42	.62	.84	1.13	1.49	2.01	2.90	3.79
Nov	.05	.12	.24	.36	.48	.61	.76	.95	1.20	1.62	2.02
Dec	.01	.03	.08	.14	.20	.29	.39	.52	.70	1.02	1.35
Ann	14.38	15.44	16.81	17.84	18.75	19.63	20.54	21.55	22.76	24.52	26.04

+ 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: 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	5.7	5.0	2	1	9.0	1993	9	16.0	1994	13+	1988	22	7	1988	2.9	2.4	.6	.3	.0	13.2	7.0	5.1	1.1
Feb	4.8	3.5	1	1	8.0	1979	27	17.5	1993	12+	1993	26	7	1993	3.0	2.0	.5	.2	.0	7.8	4.3	1.8	.7
Mar	7.2	5.0	#	1	15.0	1980	28	26.0	1980	19	1980	29	2+	1981	3.2	2.7	1.0	.3	.1	4.5	2.0	.7	.2
Apr	3.7	2.0	#	0	7.0	1977	3	20.0	1984	20	1980	2	3	1980	1.5	1.3	.5	.3	.0	1.1	.7	.4	.2
May	.2	.0	#	0	3.0	1978	6	3.0	1978	1	1978	6	#	1986	.1	.1	@	.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	.3	.0	#	0	6.0	1985	29	6.0	1985	3	1985	29	#	2000	.1	.1	@	@	.0	.1	@	.0	.0
Oct	1.6	.0	#	0	7.0	1995	23	8.0+	1995	7+	1997	26	1+	1997	.5	.5	.3	.1	.0	.7	.3	.2	.0
Nov	5.4	4.0	1	0	11.0	1983	27	17.0	1983	12+	1983	30	4	1975	2.5	2.1	.7	.2	@	5.4	2.4	1.1	.4
Dec	4.9	4.0	1	1	8.0	1978	2	13.0+	1985	13+	1982	30	7	1983	2.6	2.1	.7	.2	.0	9.3	5.7	2.8	.4
Ann	33.8	23.5	N/A	N/A	15.0	Mar 1980	28	26.0	Mar 1980	20	Apr 1980	2	7+	Feb 1993	16.4	13.3	4.3	1.6	.1	42.1	22.4	12.1	3.0

+ 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	5/20	5/17	5/14	5/12	5/10	5/08	5/06	5/04	4/30
32	5/15	5/11	5/08	5/05	5/03	5/01	4/28	4/25	4/21
28	5/04	4/30	4/27	4/25	4/22	4/20	4/18	4/15	4/11
24	4/22	4/18	4/16	4/13	4/11	4/09	4/07	4/04	3/31
20	4/14	4/09	4/04	4/01	3/28	3/25	3/21	3/17	3/11
16	4/08	4/02	3/28	3/24	3/21	3/17	3/13	3/08	3/02

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	9/14	9/18	9/21	9/23	9/26	9/28	10/01	10/04	10/08
32	9/21	9/26	9/29	10/02	10/04	10/07	10/10	10/13	10/18
28	10/03	10/07	10/10	10/12	10/15	10/17	10/20	10/23	10/27
24	10/08	10/14	10/17	10/20	10/23	10/26	10/29	11/02	11/07
20	10/15	10/21	10/25	10/28	11/01	11/04	11/07	11/11	11/17
16	11/01	11/05	11/08	11/11	11/13	11/15	11/18	11/21	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	154	148	144	141	138	135	131	127	122
32	172	165	161	157	154	150	147	142	136
28	188	184	180	177	175	172	169	166	162
24	213	207	202	198	194	191	187	182	175
20	239	232	226	221	217	212	207	202	194
16	259	251	246	241	237	232	228	222	214

***** 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	1242	971	844	525	219	35	1	13	117	442	886	1177	6472
60	1087	831	689	380	117	8	0	2	46	290	736	1022	5208
57	994	747	596	299	73	3	0	0	22	206	646	929	4515
55	932	691	534	248	50	1	0	0	12	156	586	867	4077
50	778	562	383	142	16	0	0	0	1	65	446	714	3107
32	288	181	36	1	0	0	0	0	0	0	88	246	840

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	68	135	215	467	834	1118	1337	1260	946	582	192	92	7246
55	0	0	0	25	171	429	624	547	268	25	0	0	2089
57	0	0	0	15	131	370	562	485	218	13	0	0	1794
60	0	0	0	6	82	286	469	394	153	4	0	0	1394
65	0	0	0	1	30	163	314	249	73	0	0	0	830
70	0	0	0	0	7	74	174	130	27	0	0	0	412

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	9	47	136	320	633	920	1123	1061	759	407	88	18	9	56	192	512	1145	2065	3188	4249	5008	5415	5503	5521
45	0	14	67	207	478	770	968	906	610	271	38	0	0	14	81	288	766	1536	2504	3410	4020	4291	4329	4329
50	0	0	25	114	331	620	813	751	467	157	11	0	0	0	25	139	470	1090	1903	2654	3121	3278	3289	3289
55	0	0	5	51	204	470	658	596	330	70	0	0	0	0	5	56	260	730	1388	1984	2314	2384	2384	2384
60	0	0	0	21	105	330	503	442	207	21	0	0	0	0	0	21	126	456	959	1401	1608	1629	1629	1629
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	26	67	128	238	390	590	729	694	485	288	90	37	26	93	221	459	849	1439	2168	2862	3347	3635	3725	3762

(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