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: HALEAKALA R S 338, HI **COOP ID: 511004**

Climate Division: HI 5 **NWS Call Sign:** **Elevation: 6,960 Feet** **Lat: 20˚46N** **Lon: 156˚15W**

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 >= 90	Max >= 70	Max >= 50	Max <= 32	Min <= 32	Min <= 0
Jan	60.0	42.0	51.0	78	1973	5	56.0	1995	30+	1969	24	46.9	1971	434	0	.0	.6	30.2	.0	.3	.0
Feb	59.1	41.3	50.2	76	1961	7	53.4	1977	27	1965	26	47.4	1973	420	0	.0	.8	27.4	.0	.4	.0
Mar	59.7	42.2	51.0	75	1971	25	53.2	1986	30+	1955	6	48.1	1985	419	0	.0	.6	30.3	.0	.1	.0
Apr	60.1	42.6	51.4	75+	1961	18	55.1	1996	31	1966	2	48.5	1998	409	0	.0	.5	29.9	.0	@	.0
May	62.3	44.0	53.2	76	1969	24	57.5	2000	32	1981	2	50.1	1985	369	0	.0	1.7	31.0	.0	@	.0
Jun	65.1	46.5	55.8	78+	1983	18	59.2	1988	33+	1982	2	53.7	1976	275	0	.0	4.8	30.0	.0	.0	.0
Jul	65.5	47.7	56.6	80	1953	25	60.3	1994	32+	1975	27	54.7	1984	261	0	.0	4.8	31.0	.0	.1	.0
Aug	66.1	47.8	57.0	76+	1986	23	60.2	1986	33	1976	19	54.1	1980	250	0	.0	5.0	31.0	.0	.0	.0
Sep	64.8	46.8	55.8	76	1985	18	57.7	1992	35	1955	16	53.3	1999	276	0	.0	2.6	30.0	.0	.0	.0
Oct	64.4	46.4	55.4	80	1973	6	58.8	1996	31	1985	15	53.1	1982	298	0	.0	2.4	31.0	.0	@	.0
Nov	63.2	45.9	54.6	75	1981	14	57.9	1991	29	1976	8	51.0	1974	314	0	.0	2.0	30.0	.0	.1	.0
Dec	61.2	43.5	52.4	73+	1998	15	56.0	1995	30+	1978	16	48.8	1978	393	0	.0	.9	30.6	.0	.1	.0
Ann	62.6	44.7	53.7	80+	Oct 1973	6	60.3	Jul 1994	27	Feb 1965	26	46.9	Jan 1971	4118	0	.0	26.7	362.4	.0	1.1	.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/normals/usnormals.html

Issue Date: May 2005

(1) From the 1971-2000 Monthly Normals

(2) Derived from station's available digital record: 1949-2001

(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	9.17	6.16	18.50	1980	9	43.95	1980	.11	1983
Feb	6.20	5.10	16.74	1960	13	18.25	1982	.00	2000
Mar	8.59	5.41	14.16	1980	24	42.02	1980	.05	1983
Apr	5.18	3.47	8.80	1986	9	27.12	1986	.42	1992
May	1.76	1.30	3.64	1963	15	5.64	1987	.15	2000
Jun	1.43	.97	2.90	1997	26	7.74	1997	.00	1971
Jul	2.37	1.89	3.44	1997	30	9.03	1997	.27	1999
Aug	2.08	1.54	11.95	1950	15	6.17	1982	.07	1973
Sep	2.27	1.84	2.00	2000	7	6.03	1992	.60	1977
Oct	2.75	2.25	4.65	1993	24	8.72	1993	.13	1984
Nov	5.43	4.70	14.10	1968	29	17.14	1990	.30	1991
Dec	5.89	5.59	12.23	1954	11	17.19	1996	.17	2000
Ann	53.12	49.35	18.50	Jan 1980	9	43.95	Jan 1980	.00+	Feb 2000

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	11.1	7.1	4.0	2.1
Feb	10.8	6.7	3.3	1.8
Mar	13.6	8.3	4.2	2.3
Apr	14.3	7.6	2.8	1.0
May	10.9	4.6	.7	.2
Jun	8.9	3.4	.8	.2
Jul	12.8	5.5	1.1	.4
Aug	10.9	4.6	.9	.4
Sep	12.4	5.9	1.3	.3
Oct	12.0	5.5	1.5	.6
Nov	12.6	7.1	2.9	1.4
Dec	11.2	6.4	3.0	1.6
Ann	141.5	72.7	26.5	12.3

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	.18	.48	1.29	2.37	3.73	5.46	7.68	10.68	15.06	22.82	30.79
Feb	.14	.52	1.31	2.18	3.17	4.33	5.74	7.54	10.05	14.34	18.60
Mar	.33	.74	1.67	2.78	4.10	5.69	7.67	10.25	13.93	20.30	26.72
Apr	.29	.58	1.21	1.91	2.70	3.64	4.78	6.25	8.31	11.81	15.30
May	.25	.39	.64	.89	1.14	1.42	1.75	2.15	2.69	3.57	4.42
Jun	.01	.07	.22	.41	.63	.91	1.25	1.71	2.36	3.49	4.63
Jul	.27	.45	.78	1.11	1.46	1.86	2.32	2.90	3.68	4.98	6.24
Aug	.25	.41	.70	.99	1.30	1.64	2.04	2.54	3.21	4.32	5.40
Sep	.60	.82	1.14	1.43	1.72	2.01	2.34	2.74	3.25	4.05	4.80
Oct	.41	.65	1.04	1.42	1.82	2.25	2.75	3.35	4.17	5.50	6.77
Nov	.35	.67	1.35	2.09	2.92	3.89	5.07	6.57	8.67	12.22	15.75
Dec	.39	.76	1.50	2.30	3.21	4.26	5.52	7.13	9.38	13.18	16.94
Ann	21.14	26.04	32.99	38.74	44.16	49.67	55.63	62.51	71.25	84.63	96.81

\+ 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: 1949-2001
(3) Derived from 1971-2000 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	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	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	.0	0	0	.0	0	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	.0	0	0	.0	0	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

@ 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	6/19	5/30	5/16	5/04	4/23	4/11	3/29	3/12	2/08
32	4/14	3/07	2/02	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	10/12	11/06	11/25	12/11	12/27	1/12	1/30	2/24	0/00
32	12/04	12/29	1/20	2/18	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	310	272	244	219	194	166	128
32	>365	>365	>365	>365	>365	>365	>365	316	266
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	434	420	419	409	369	275	261	250	276	298	314	393	4118
60	281	274	280	259	217	132	113	105	129	147	170	239	2346
57	195	191	189	173	135	66	48	45	57	72	96	153	1420
55	144	138	132	119	91	36	20	18	26	39	60	103	926
50	52	40	33	29	20	3	0	0	0	2	9	23	211
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	589	510	588	581	654	715	762	773	714	725	676	630	7917
55	19	4	7	10	32	61	69	79	50	51	46	19	447
57	9	1	2	4	14	31	36	43	21	22	22	8	213
60	2	0	0	0	3	7	7	10	3	4	6	0	42
65	0	0	0	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0	0	0	0

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	349	310	349	353	415	483	521	533	485	487	446	393	349	659	1008	1361	1776	2259	2780	3313	3798	4285	4731	5124
45	196	168	195	205	260	333	366	378	335	332	296	238	196	364	559	764	1024	1357	1723	2101	2436	2768	3064	3302
50	72	59	68	72	115	184	211	223	185	177	147	96	72	131	199	271	386	570	781	1004	1189	1366	1513	1609
55	9	4	4	11	27	62	77	81	55	52	39	19	9	13	17	28	55	117	194	275	330	382	421	440
60	0	0	0	0	0	10	14	12	0	1	0	0	0	0	0	0	0	10	24	36	36	37	37	37
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	163	149	159	166	203	241	261	272	242	238	214	185	163	312	471	637	840	1081	1342	1614	1856	2094	2308	2493

(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 were calculated from a serially complete daily data set. A serial dataset was not available for precipitation,
To ensure that a station's data was adequate to estimate these statistics, the following criteria were used:
1. A station must have 80% of its data for the 1971-2000 time period.
2. Only months with at least 21 days are used.
3. There must be a least 21 months (meeting criteria 2.) in the sample.

g. Snowfall and snow depth statistics were derived daily values quality controlled to be consistent with 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 differences 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. Other inconsistencies may appear from comparing statistically modeled values such as degree days to observed temperatures.

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. 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