

Climatology of the United States No. 20

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801
www.ncdc.noaa.gov

Station: MAUNA LOA SLOPE OBS, HI

1971-2000

COOP ID: 516198

Climate Division: HI 6

NWS Call Sign: MKK

Elevation: 11,150 Feet Lat: 19° 32N

Lon: 155° 35W

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	50.0	33.9	42.0	67	1998	20	47.8	1986	19	1971	22	36.3	1975	715	0	.0	.0	18.7	.0	10.7	.0
Feb	50.2	33.7	42.0	64	1991	28	47.0	1998	18	1962	20	37.1	1976	645	0	.0	.0	15.5	.1	11.7	.0
Mar	51.0	34.1	42.6	65	1995	20	47.4	1983	20	1955	12	36.7	1976	679	0	.0	.0	19.0	.0	10.6	.0
Apr	52.2	35.1	43.7	67	1959	26	47.8	1993	24	1956	13	39.5	1989	641	0	.0	.0	21.7	.0	6.5	.0
May	54.2	37.4	45.8	68	1958	30	49.9	1996	27	1971	9	42.3	1976	595	0	.0	.0	27.1	.0	2.5	.0
Jun	57.5	40.3	48.9	71+	1998	25	52.0	1995	28	1956	3	45.0	1974	483	0	.0	.1	28.9	.0	.4	.0
Jul	56.5	39.6	48.1	70+	2001	30	50.9	1991	26	1955	5	44.8	1975	526	0	.0	.0	30.2	.0	.3	.0
Aug	56.6	39.7	48.2	68+	1999	31	50.7	1986	28	1955	12	45.0	1971	523	0	.0	.0	30.2	.0	.4	.0
Sep	55.4	39.1	47.3	67+	1995	20	49.3	1988	29+	1962	13	44.4	1976	534	0	.0	.0	29.1	.0	.3	.0
Oct	54.8	38.6	46.7	66+	1999	8	48.7	1987	27	1965	31	44.4	1974	568	0	.0	.0	28.8	.0	.4	.0
Nov	52.6	37.3	45.0	65	2001	21	48.2	1982	25+	1964	9	40.6	1978	602	0	.0	.0	23.7	.0	2.7	.0
Dec	51.1	35.2	43.2	67	1956	6	47.2	1986	22	1959	29	39.1	1971	678	0	.0	.0	20.7	@	6.9	.0
Ann	53.5	37.0	45.3	71+	Jun 1998	25	52.0	Jun 1995	18	Feb 1962	20	36.3	Jan 1975	7189	0	.0	.1	293.6	.1	53.4	.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/normal/usnormals.html

Issue Date: May 2005

(1) From the 1971-2000 Monthly Normals

(2) Derived from station's available digital record: 1955-2001

(3) Derived from 1971-2000 serially complete daily data

033-A

**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: MAUNA LOA SLOPE OBS, HI

COOP ID: 516198

Climate Division: HI 6

NWS Call Sign: MKK

Elevation: 11,150 Feet Lat: 19°32N

Lon: 155°35W

Precipitation (inches)																								
	Precipitation Totals									Mean Number of Days (3)				Precipitation Probabilities (1) Probability that the monthly/annual precipitation will be equal to or less than the indicated amount										
	Means/ Medians(1)		Extremes							Daily Precipitation				Monthly/Annual Precipitation vs Probability Levels These values were determined from the incomplete gamma distribution										
Month	Mean	Med-ian	Highest Daily(2)	Year	Day	Highest Monthly(1)	Year	Lowest Monthly(1)	Year	>= 0.01	>= 0.10	>= 0.50	>= 1.00	.05	.10	.20	.30	.40	.50	.60	.70	.80	.90	.95
Jan	2.97	1.80	5.36	1959	18	12.78	1990	.00+	1986	4.3	2.1	.9	.4	.00	.00	.04	.25	.61	1.16	1.96	3.13	4.97	8.39	12.06
Feb	1.68	.99	2.86	1982	11	10.12	1982	.00+	1983	3.7	2.1	.3	.1	.00	.00	.08	.26	.50	.83	1.28	1.90	2.82	4.50	6.24
Mar	2.29	.77	1.98	1985	1	15.57	1980	.00+	1998	4.6	2.3	.5	.1	.00	.00	.13	.37	.71	1.17	1.78	2.61	3.85	6.09	8.42
Apr	1.23	.47	4.45	1986	11	9.41	1986	.00	1973	4.4	2.4	.5	.2	.00	.00	.03	.14	.32	.56	.89	1.36	2.07	3.36	4.71
May	.74	.32	1.90	1965	4	5.04	1989	.00+	1996	2.8	1.2	.3	.1	.00	.00	.01	.08	.19	.35	.55	.83	1.26	2.01	2.81
Jun	.53	.27	.99	1989	2	2.49	1983	.00+	1993	2.4	.8	.2	.0	.00	.00	.01	.06	.15	.26	.40	.60	.90	1.43	1.98
Jul	1.32	.95	2.01	1997	30	5.39	1993	.00+	1988	3.3	1.9	.6	.2	.00	.03	.15	.32	.53	.80	1.13	1.57	2.20	3.32	4.45
Aug	1.33	.82	3.90	1957	24	5.54	1982	.00+	1999	3.8	2.3	.7	.2	.00	.04	.19	.38	.59	.86	1.18	1.60	2.20	3.24	4.29
Sep	1.25	.87	2.95	1957	3	4.57	1992	.07	1999	4.0	1.9	.4	.0	.03	.11	.28	.46	.66	.89	1.17	1.52	2.02	2.85	3.68
Oct	1.16	.74	2.33	1974	27	4.52	1979	.00	1981	4.1	2.4	.4	.1	.05	.15	.32	.49	.68	.88	1.13	1.43	1.84	2.53	3.20
Nov	2.38	1.86	3.78	1967	26	10.32	1990	.01	1989	4.1	2.3	.6	.2	.01	.05	.22	.48	.82	1.28	1.88	2.71	3.94	6.16	8.46
Dec	1.89	.60	4.50	1987	18	16.54	1987	.00	1997	2.3	1.3	.3	.2	.00	.00	.05	.21	.48	.85	1.36	2.09	3.19	5.20	7.31
Ann	18.77	16.71	5.36	Jan 1959	18	16.54	Dec 1987	.00+	Aug 1999	43.8	23.0	5.7	1.8	5.31	7.09	9.79	12.13	14.42	16.81	19.45	22.57	26.62	32.96	38.88

+ 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: 1955-2001

(3) Derived from 1971-2000 daily data

Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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: MAUNA LOA SLOPE OBS, HI

COOP ID: 516198

Climate Division: HI 6

NWS Call Sign: MKK

Elevation: 11,150 Feet

Lat: 19°32N

Lon: 155°35W

Snow (inches)																							
Snow Totals															Mean Number of Days (1)								
Means/Medians (1)					Extremes (2)										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	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Feb	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Mar	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Apr	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
May	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.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	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Oct	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Nov	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Dec	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Ann	.0	.0	N/A	N/A	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.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

Complete documentation available from:

www.ncdc.noaa.gov/oa/climate/normal/usnormals.html

Climatography of the United States

No. 20 1971-2000

Station: MAUNA LOA SLOPE OBS, HI

COOP ID: 516198

Climate Division: HI 6

NWS Call Sign: MKK

Elevation: 11,150 Feet

Lat: 19° 32N

Lon: 155° 35W

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	8/10	8/02	7/27	7/22	7/17	7/13	7/08	7/02	6/24
32	7/07	6/21	6/09	5/31	5/21	5/12	5/02	4/21	4/04
28	4/20	4/09	3/31	3/24	3/17	3/11	3/03	2/23	2/11
24	1/31	1/14	12/23	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	7/21	7/31	8/06	8/12	8/18	8/23	8/29	9/05	9/15
32	9/07	9/24	10/07	10/18	10/28	11/07	11/18	12/01	12/18
28	11/29	12/10	12/19	12/26	1/02	1/09	1/16	1/25	2/06
24	12/30	1/20	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	76	61	49	39	30	21	12	0	0
32	248	217	195	177	159	141	123	101	70
28	339	320	308	298	288	279	270	258	243
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

Complete documentation available from:

www.ncdc.noaa.gov/oa/climate/normal/usnormals.html

**Climatography
of the United States
No. 20
1971-2000**

Station: MAUNA LOA SLOPE OBS, HI

COOP ID: 516198

Climate Division: HI 6 NWS Call Sign: MKK Elevation: 11,150 Feet Lat: 19° 32N Lon: 155° 35W

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	715	645	679	641	595	483	526	523	534	568	602	678	7189
60	560	505	541	491	440	333	371	368	384	413	452	523	5381
57	467	421	448	401	347	246	278	275	294	320	362	430	4289
55	409	365	386	341	287	190	217	213	234	258	302	368	3570
50	267	231	239	199	151	79	85	77	92	109	161	219	1909
32	11	2	1	0	0	0	0	0	0	0	0	1	15

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	319	281	328	349	428	507	497	500	457	455	388	346	4855
55	4	0	0	0	2	7	1	0	0	0	0	0	14
57	0	0	0	0	0	3	0	0	0	0	0	0	3
60	0	0	0	0	0	0	0	0	0	0	0	0	0
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	108	88	98	128	194	268	257	263	225	217	158	120	108	196	294	422	616	884	1141	1404	1629	1846	2004	2124
45	32	23	27	32	65	125	107	110	84	73	40	30	32	55	82	114	179	304	411	521	605	678	718	748
50	0	0	0	0	0	31	16	17	4	1	0	0	0	0	0	0	0	31	47	64	68	69	69	69
55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	43	34	44	55	81	118	112	114	91	88	58	47	43	77	121	176	257	375	487	601	692	780	838	885

(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:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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.

Complete 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 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

c. Snow Tables

1. Cooperative Summary of the Day

d. Freeze Data Table

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

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