

Climatography of the United States

No. 20

1971-2000

Station: MANHATTAN, KS

COOP ID: 144972

Climate Division: KS 3

NWS Call Sign:

Elevation: 1,065 Feet Lat: 39°13N Lon: 96°36W

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	39.5	16.1	27.8	74	1939	2	39.6	1990	-31	1947	4	13.7	1979	1153	0	.0	.0	7.8	9.7	28.5	2.6
Feb	46.8	21.5	34.2	84	1972	29	44.3	1976	-26	1905	13	20.3	1979	864	0	.0	.0	11.5	5.8	22.1	1.6
Mar	57.5	31.4	44.5	95	1907	25	50.7	1986	-12	1948	11	36.8	1975	637	0	.0	.0	21.5	1.0	16.0	.2
Apr	67.9	42.2	55.1	99	1910	29	63.3	1981	5	1920	5	47.5	1983	315	17	.0	.5	28.1	@	5.0	.0
May	77.5	52.5	65.0	103+	1934	31	70.3	1977	23	1907	4	59.0	1995	106	106	@	1.4	31.0	.0	.2	.0
Jun	87.1	62.3	74.7	112	1911	25	78.5	1971	39	1946	3	69.5	1992	7	298	1.0	10.3	30.0	.0	.0	.0
Jul	92.5	67.3	79.9	115+	1936	24	87.6	1980	38	1902	11	75.4	1971	0	461	4.0	19.7	31.0	.0	.0	.0
Aug	90.8	65.1	78.0	116	1936	13	85.4	2000	40	1916	28	72.3	1992	4	405	3.2	16.6	31.0	.0	.0	.0
Sep	82.1	55.5	68.8	112	1947	3	73.4	1978	26+	1995	22	62.1	1974	48	163	.7	6.9	30.0	.0	.3	.0
Oct	70.7	43.2	57.0	98+	1947	5	60.8	2000	13	1993	31	50.7	1976	265	15	.0	.8	29.9	.0	3.1	.0
Nov	54.5	30.2	42.4	87	1909	4	50.9	1999	-9	1952	28	35.4	1985	679	0	.0	.0	19.6	1.1	15.9	@
Dec	42.9	19.9	31.4	77	1939	6	36.5	1991	-22	1989	23	14.4	1983	1042	0	.0	.0	9.5	5.4	27.1	1.7
Ann	67.5	42.3	54.9	116	Aug 1936	13	87.6	Jul 1980	-31	Jan 1947	4	13.7	Jan 1979	5120	1465	8.9	56.2	280.9	23.0	118.2	6.1

+ 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: February 2004

(1) From the 1971-2000 Monthly Normals

(2) Derived from station's available digital record: 1900-2001

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

064-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: MANHATTAN, KS

COOP ID: 144972

Climate Division: KS 3

NWS Call Sign:

Elevation: 1,065 Feet Lat: 39°13N

Lon: 96°36W

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	.86	.79	1.25	1915	16	3.16	1979	.00+	1997	5.4	2.5	.3	.0	.00	.11	.27	.41	.55	.70	.87	1.07	1.35	1.80	2.23
Feb	1.00	.92	1.91	1911	17	2.48	1997	.04	1991	5.2	2.5	.6	.1	.12	.20	.34	.48	.63	.79	.98	1.22	1.54	2.07	2.58
Mar	2.59	2.11	2.85	1927	31	7.40	1973	.10	1997	7.9	4.9	1.9	.6	.39	.61	.98	1.34	1.71	2.12	2.59	3.16	3.93	5.18	6.39
Apr	3.07	2.22	3.78	1985	27	9.52	1999	.45	1989	10.0	6.0	1.8	.8	.62	.90	1.35	1.77	2.18	2.62	3.13	3.73	4.53	5.81	7.02
May	5.08	4.53	5.18	1962	29	14.73	1995	1.60	1998	12.0	7.8	3.2	1.6	1.35	1.83	2.57	3.21	3.85	4.51	5.25	6.13	7.27	9.06	10.74
Jun	5.23	4.62	6.28	1977	18	11.55	1977	2.01	1991	10.9	6.7	3.4	1.5	2.00	2.48	3.18	3.76	4.31	4.87	5.47	6.18	7.07	8.45	9.71
Jul	4.10	3.20	4.86	1951	10	17.56	1993	.32	1983	8.6	5.7	2.6	1.3	.49	.81	1.38	1.96	2.56	3.24	4.03	5.01	6.34	8.52	10.64
Aug	3.27	2.93	6.00	1946	13	7.25	1977	.00	1971	9.2	5.4	1.8	.9	.42	.83	1.38	1.85	2.31	2.81	3.36	4.03	4.90	6.30	7.62
Sep	3.67	3.28	4.64	1931	1	9.89	1973	.43	1994	8.1	4.9	2.3	1.2	.64	.96	1.49	2.00	2.51	3.07	3.71	4.48	5.51	7.17	8.76
Oct	2.77	2.38	5.69	1973	11	6.49	1973	.09	1999	7.7	4.4	1.8	.7	.25	.44	.81	1.20	1.62	2.10	2.67	3.38	4.36	5.99	7.60
Nov	2.10	1.51	3.32	1916	8	5.79	1998	.00	1989	7.0	4.1	1.4	.5	.10	.28	.59	.90	1.23	1.60	2.04	2.58	3.32	4.56	5.77
Dec	1.06	.85	2.06	1980	8	3.40	1973	.00	1976	5.2	2.5	.6	.2	.02	.08	.20	.35	.52	.72	.96	1.27	1.72	2.48	3.24
Ann	34.80	34.34	6.28	Jun 1977	18	17.56	Jul 1993	.00+	Jan 1997	97.2	57.4	21.7	9.4	22.15	24.50	27.55	29.91	32.03	34.10	36.26	38.67	41.62	45.95	49.74

+ 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: 1900-2001

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

Complete documentation available from:
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Station: MANHATTAN, KS

COOP ID: 144972

Climate Division: KS 3

NWS Call Sign:

Elevation: 1,065 Feet

Lat: 39°13N

Lon: 96°36W

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	4.9	3.7	1	1	8.5	1979	13	16.2	1985	14	1979	14	10	1979	3.1	2.0	.4	.2	.0	8.7	4.1	1.9	.0
Feb	4.3	3.2	1	#	10.0	1971	22	18.5	1978	13	1979	1	9	1979	2.2	1.4	.6	.2	@	5.7	3.2	2.0	.2
Mar	2.3	.8	#	#	9.0	1998	8	9.0	1998	15	1998	9	2	1998	1.2	.7	.4	.2	.0	1.4	.8	.2	.0
Apr	.3	.0	#	0	3.8	1975	2	4.8	1975	4	1975	2	#+	1997	.3	.1	@	.0	.0	.2	.1	.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	1.1	1991	31	1.1	1991	1	1991	31	#+	1996	@	@	.0	.0	.0	@	.0	.0	.0
Nov	1.3	.1	#	#	7.8	1975	26	8.8	1975	8	1975	26	1	1991	.9	.6	.1	@	.0	.9	.2	.1	.0
Dec	2.8	1.7	1	#	5.8	1983	21	14.6	1983	9	1983	21	4	1983	2.2	1.2	.3	.1	.0	3.3	1.0	@	.0
Ann	15.9	9.5	N/A	N/A	10.0	Feb 1971	22	18.5	Feb 1978	15	Mar 1998	9	10	Jan 1979	9.9	6.0	1.8	.7	@	20.2	9.4	4.2	.2

+ 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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NWS Call Sign:

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Lat: 39° 13N

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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	5/15	5/10	5/06	5/02	4/29	4/26	4/23	4/19	4/14
32	5/05	4/30	4/26	4/23	4/20	4/17	4/14	4/10	4/05
28	4/22	4/17	4/14	4/11	4/08	4/05	4/02	3/30	3/25
24	4/11	4/07	4/03	3/31	3/28	3/25	3/22	3/19	3/14
20	3/31	3/27	3/23	3/20	3/17	3/15	3/12	3/08	3/03
16	3/26	3/18	3/13	3/08	3/04	2/28	2/23	2/18	2/11
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	9/20	9/24	9/28	9/30	10/03	10/05	10/08	10/11	10/15
32	9/28	10/03	10/07	10/11	10/14	10/17	10/20	10/24	10/29
28	10/06	10/12	10/17	10/20	10/24	10/27	10/31	11/04	11/10
24	10/22	10/28	11/01	11/05	11/08	11/11	11/15	11/19	11/25
20	11/01	11/07	11/11	11/15	11/18	11/22	11/26	11/30	12/06
16	11/08	11/14	11/19	11/23	11/27	11/30	12/04	12/09	12/15
Freeze Free Period									
Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	175	168	163	159	156	152	148	143	137
32	198	190	185	180	176	172	167	161	154
28	223	214	208	203	198	193	188	182	174
24	250	241	235	229	224	219	213	207	198
20	270	261	255	250	245	240	235	229	221
16	297	287	279	273	267	261	254	246	236

* 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)													
Base	Heating Degree Days (1)												
Below	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
65	1153	864	637	315	106	7	0	4	48	265	679	1042	5120
60	998	734	490	198	46	1	0	0	14	148	533	887	4049
57	907	655	403	141	24	0	0	0	5	95	450	794	3474
55	846	604	349	109	15	0	0	0	2	68	395	735	3123
50	702	481	230	49	3	0	0	0	0	25	272	591	2353
32	261	163	21	0	0	0	0	0	0	0	32	179	656

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	132	223	407	692	1023	1281	1484	1424	1105	773	343	160	9047
55	3	20	22	111	324	591	771	711	416	129	16	3	3117
57	2	16	14	83	271	531	709	649	359	93	10	0	2737
60	0	10	7	50	200	442	616	556	278	53	3	0	2215
65	0	0	0	17	106	298	461	405	163	15	0	0	1465
70	0	0	0	4	43	172	311	266	80	2	0	0	878

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	27	89	238	478	788	1050	1247	1195	890	561	185	42	27	116	354	832	1620	2670	3917	5112	6002	6563	6748	6790
45	5	42	143	340	633	900	1092	1040	740	412	104	13	5	47	190	530	1163	2063	3155	4195	4935	5347	5451	5464
50	0	17	79	219	480	750	937	885	591	278	52	5	0	17	96	315	795	1545	2482	3367	3958	4236	4288	4293
55	0	3	39	129	330	600	782	730	445	172	19	0	0	3	42	171	501	1101	1883	2613	3058	3230	3249	3249
60	0	0	11	64	201	450	627	575	315	85	3	0	0	0	11	75	276	726	1353	1928	2243	2328	2331	2331
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	28	75	169	302	502	706	838	799	583	356	121	35	28	103	272	574	1076	1782	2620	3419	4002	4358	4479	4514

(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/normal/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/normal/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 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.

- | | |
|---|---|
| <ol style="list-style-type: none">a. Temperature/ Precipitation Tables<ol style="list-style-type: none">1. 1971-2000 Monthly Normals2. Cooperative Summary of the Day3. National Weather Service station records4. 1971-2000 serially complete daily datab. Degree Day Table<ol style="list-style-type: none">1. Monthly and Annual Heating and Cooling Degree Days Normals to Selected Bases derived from 1971-2000 Monthly Normals2. Daily Normal Growing Degree Units to Selected Base Temperatures derived from 1971-2000 serially complete daily data | <ol style="list-style-type: none">c. Snow Tables<ol style="list-style-type: none">1. Snow Climatology2. Cooperative Summary of the Dayd. Freeze Data Table
1971-2000 serially complete daily data |
|---|---|

References

U.S. Climate Normals 1971-2000, www.ncdc.noaa.gov/normal.html
U.S. Climate Normals 1971-2000-Products Clim20, www.ncdc.noaa.gov/oa/climate/normal/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