

Climatology of the United States

No. 20

1971-2000

Station: MISSOULA INTL AP, MT

COOP ID: 245745

Climate Division: MT 1

NWS Call Sign: MSO

Elevation: 3,192 Feet Lat: 46° 55N

Lon: 114° 06W

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	30.8	16.2	23.5	59	1953	9	33.8	1994	-33	1957	26	5.6	1979	1291	0	.0	.0	.6	14.8	29.3	4.4
Feb	37.4	20.5	29.0	66	1995	24	36.4	1992	-27+	1996	2	15.8	1989	1019	0	.0	.0	2.5	6.9	26.2	1.9
Mar	48.1	27.1	37.6	75	1978	29	43.3	1992	-13	1955	5	32.6	1989	852	0	.0	.0	13.4	1.3	25.3	.1
Apr	58.0	32.4	45.2	87	1987	28	50.1	1987	14	1951	19	39.3	1975	596	0	.0	.0	23.9	.0	15.7	.0
May	66.1	39.3	52.7	95	1986	30	58.8	1993	21+	1999	8	48.2	1996	384	3	.0	.3	29.8	.0	4.6	.0
Jun	74.5	45.9	60.2	98+	1987	14	65.5	1986	30	1999	10	55.4	1975	178	33	.0	2.4	30.0	.0	.2	.0
Jul	83.6	50.2	66.9	105+	1973	10	74.8	1985	31	1971	7	59.4	1993	55	111	.4	8.9	31.0	.0	@	.0
Aug	83.2	49.3	66.3	105	1961	4	71.5	1971	30	1992	25	61.8	1980	62	99	.2	8.7	31.0	.0	.1	.0
Sep	71.5	40.6	56.1	99	1967	1	62.6	1990	20+	2000	23	50.5	1985	276	10	.0	1.0	29.4	.0	3.6	.0
Oct	57.4	31.4	44.4	85+	1980	4	50.3	1988	0	1971	29	40.3	1985	637	0	.0	.0	24.0	.2	17.4	@
Nov	40.0	24.0	32.0	73	1999	12	37.5	1999	-23	1955	16	21.7	1985	985	0	.0	.0	4.7	5.9	25.8	.6
Dec	30.3	16.5	23.4	60	1956	3	31.2	1979	-30+	1983	23	11.8	1983	1287	0	.0	.0	.7	17.3	29.3	2.9
Ann	56.7	32.8	44.8	105+	Jul 1973	10	74.8	Jul 1985	-33	Jan 1957	26	5.6	Jan 1979	7622	256	.6	21.3	221.0	46.4	177.5	9.9

+ 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: 1948-2001

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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	Median	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	1.06	.88	.84	1962	7	2.07+	1982	.16	1981	13.3	3.6	.1	.0	.23	.33	.48	.62	.76	.91	1.08	1.29	1.56	1.98	2.39
Feb	.77	.67	1.02	1975	7	2.18	1986	.17	1973	10.1	2.5	.1	@	.15	.22	.33	.44	.54	.66	.78	.94	1.14	1.47	1.78
Mar	.96	.93	.75	1992	17	2.10	1989	.23	1973	11.7	2.9	.2	.0	.32	.41	.54	.65	.76	.88	1.00	1.14	1.33	1.62	1.88
Apr	1.09	.96	1.60	1951	30	3.01	1994	.08	1977	10.7	3.3	.3	.1	.21	.31	.47	.61	.76	.92	1.11	1.33	1.62	2.09	2.54
May	1.95	1.71	1.83	1980	25	7.38	1980	.44	1974	11.9	5.6	.9	.1	.42	.60	.88	1.14	1.40	1.68	1.99	2.37	2.86	3.65	4.39
Jun	1.73	1.63	1.55	1958	11	4.23	1998	.38	1985	11.3	5.1	.8	.1	.55	.71	.96	1.17	1.37	1.58	1.81	2.07	2.42	2.96	3.46
Jul	1.09	.89	1.62	1987	21	3.16	1998	.09+	1985	8.0	3.3	.3	.1	.16	.25	.41	.56	.71	.89	1.08	1.33	1.66	2.19	2.70
Aug	1.15	1.13	1.13+	1990	11	3.29	1985	.17	2000	7.9	3.4	.4	@	.21	.31	.48	.63	.79	.97	1.16	1.40	1.71	2.22	2.71
Sep	1.08	.72	1.30	1954	15	3.60	1985	.05	1979	7.8	2.9	.4	@	.08	.15	.29	.44	.60	.79	1.02	1.31	1.71	2.38	3.05
Oct	.83	.63	1.05	1975	21	3.51	1975	.01	1978	7.6	2.5	.2	.1	.06	.12	.23	.34	.47	.61	.79	1.01	1.31	1.82	2.33
Nov	.96	.88	.74	1998	21	3.00	1998	.22	1976	11.6	3.1	.2	.0	.19	.28	.42	.55	.68	.82	.98	1.17	1.42	1.82	2.19
Dec	1.15	.97	.82	1996	29	4.65	1996	.25	1976	12.8	3.6	.1	.0	.24	.35	.52	.67	.82	.99	1.18	1.40	1.70	2.17	2.62
Ann	13.82	13.21	1.83	May 1980	25	7.38	May 1980	.01	Oct 1978	124.7	41.8	4.0	.5	8.94	9.85	11.03	11.94	12.76	13.55	14.38	15.30	16.43	18.09	19.53

+ 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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Lon: 114° 06W

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	10.8	9.2	4	3	11.1	1980	9	28.3	1996	19+	1982	24	14	1979	10.5	3.8	.8	.2	@	23.4	15.8	9.3	2.3
Feb	7.0	7.0	2	1	14.4	1975	7	20.1	1975	23+	1979	5	12	1979	7.2	2.1	.5	.2	@	13.7	7.9	5.3	1.3
Mar	5.4	4.9	#	1	6.5	1977	19	16.7	1997	9	1997	11	2+	1997	5.8	1.8	.4	.1	.0	4.8	1.8	.7	.0
Apr	1.4	.4	#	0	5.3	1997	4	6.6	1982	3	1997	5	#	1997	2.0	.4	.1	@	.0	.3	@	.0	.0
May	.4	#	#	0	7.3	1978	23	8.1	1978	#+	1999	9	#	2000	.3	.1	@	@	.0	.0	.0	.0	.0
Jun	#	.0	#	0	#	1973	17	#	1973	0	0	0	#	1978	.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	.4	1983	19	.4	1983	#	1972	24	0	0	.1	.0	.0	.0	.0	.0	.0	.0	.0
Oct	.9	.2	#	0	5.4	1973	31	5.4	1973	3+	1985	7	#	1991	1.1	.2	.1	@	.0	.3	.1	.0	.0
Nov	6.2	5.9	#	0	6.1	1996	19	16.1	1996	10+	1996	27	4	1996	6.1	2.2	.5	.1	.0	5.1	2.1	.8	.1
Dec	11.2	8.7	2	2	10.3	1996	24	54.1	1996	27	1996	29	11	1996	10.6	4.0	.8	.2	@	18.5	10.6	5.5	.7
Ann	43.3	36.3	N/A	N/A	14.4	Feb 1975	7	54.1	Dec 1996	27	Dec 1996	29	14	Jan 1979	43.7	14.6	3.2	.8	@	66.1	38.3	21.6	4.4

+ 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	7/08	6/30	6/25	6/21	6/17	6/13	6/08	6/03	5/27
32	6/15	6/08	6/03	5/30	5/26	5/22	5/18	5/13	5/06
28	5/19	5/14	5/10	5/07	5/04	5/01	4/28	4/24	4/19
24	5/07	4/30	4/25	4/21	4/17	4/12	4/08	4/03	3/27
20	4/16	4/08	4/03	3/29	3/25	3/20	3/15	3/10	3/02
16	3/28	3/21	3/16	3/11	3/07	3/03	2/27	2/21	2/14
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	8/24	8/29	9/02	9/05	9/08	9/11	9/14	9/18	9/23
32	9/04	9/09	9/12	9/15	9/18	9/21	9/24	9/27	10/02
28	9/14	9/19	9/22	9/25	9/27	9/30	10/03	10/06	10/11
24	9/25	9/30	10/04	10/07	10/11	10/14	10/17	10/21	10/26
20	10/07	10/14	10/19	10/24	10/28	11/01	11/06	11/11	11/18
16	10/29	11/03	11/07	11/10	11/13	11/16	11/20	11/24	11/29
Freeze Free Period									
Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	109	100	93	87	82	77	71	65	56
32	139	131	124	119	114	110	104	98	90
28	169	161	155	150	146	141	136	130	122
24	206	196	188	182	176	170	164	157	147
20	249	238	230	223	217	210	203	195	184
16	274	266	260	255	250	246	241	235	227

* 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
65	1291	1019	852	596	384	178	55	62	276	637	985	1287	7622
60	1132	869	695	445	245	86	27	24	175	484	840	1136	6158
57	1039	785	602	357	173	47	13	11	119	392	750	1043	5331
55	977	729	540	300	132	29	8	5	89	332	690	981	4812
50	822	589	386	173	56	6	0	1	35	193	540	826	3627
32	336	183	31	0	0	0	0	0	0	2	120	320	992

Cooling Degree Days (1)

Base	Cooling Degree Days (1)												
	Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
32	32	63	202	396	642	845	1081	1062	721	389	103	29	5565
55	0	0	0	9	60	181	370	353	107	6	0	0	1086
57	0	0	0	5	40	139	311	294	76	2	0	0	867
60	0	0	0	1	19	88	228	213	40	0	0	0	589
65	0	0	0	0	3	33	111	99	10	0	0	0	256
70	0	0	0	0	1	7	36	28	1	0	0	0	73

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	0	3	49	183	403	616	842	824	491	180	20	2	0	3	52	235	638	1254	2096	2920	3411	3591	3611	3613
45	0	0	10	87	262	466	687	669	349	81	3	0	0	0	10	97	359	825	1512	2181	2530	2611	2614	2614
50	0	0	0	34	142	316	532	514	218	30	0	0	0	0	0	34	176	492	1024	1538	1756	1786	1786	1786
55	0	0	0	12	62	189	380	364	113	5	0	0	0	0	0	12	74	263	643	1007	1120	1125	1125	1125
60	0	0	0	0	20	92	237	219	43	0	0	0	0	0	0	0	20	112	349	568	611	611	611	611
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	0	4	48	141	260	379	524	515	332	139	10	0	0	4	52	193	453	832	1356	1871	2203	2342	2352	2352

(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 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/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