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: VALENTINE MILLER AP, NE **COOP ID: 258760**

Climate Division: NE 2 **NWS Call Sign: VTN** **Elevation: 2,590 Feet** **Lat: 42˚52N** **Lon: 100˚33W**

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	33.8	7.8	20.8	72	1987	12	32.3	1990	-30	1988	9	4.5	1979	1386	0	.0	.0	4.7	13.8	30.7	9.7
Feb	39.4	13.7	26.6	78	1982	22	36.3	1999	-31	1994	9	10.7	1978	1091	0	.0	.0	8.1	9.5	27.6	5.4
Mar	48.4	22.1	35.3	85+	1993	25	41.7	1986	-29	1980	1	26.9	1996	932	0	.0	.0	14.3	4.7	26.9	1.3
Apr	59.8	32.4	46.1	100	1992	30	54.3	1981	3+	1997	13	39.9	1997	571	5	@	.3	22.7	.7	15.2	.0
May	71.2	43.7	57.5	99	1989	23	63.0	1977	19	1967	3	52.5	1995	260	27	.0	1.2	30.0	.0	2.6	.0
Jun	81.9	53.2	67.6	110	1988	24	76.1	1988	30	1969	14	62.5	1982	57	141	.9	6.9	29.9	.0	@	.0
Jul	88.3	59.1	73.7	114	1990	2	78.5	1974	38	1971	30	65.5	1992	11	286	3.1	13.9	31.0	.0	.0	.0
Aug	86.9	57.3	72.1	108	1965	13	78.2	1983	34	1988	28	66.2	1992	19	242	1.6	12.9	31.0	.0	.0	.0
Sep	77.2	45.8	61.5	104	1998	4	69.3	1998	17+	1991	19	56.8	1973	175	75	.5	5.8	29.5	.0	2.1	.0
Oct	63.5	33.1	48.3	96+	1993	6	51.8	1973	-1	1991	31	44.2	1976	516	3	.0	.4	26.0	.4	13.4	@
Nov	45.9	20.1	33.0	86+	1999	8	43.4	1999	-22	1959	14	18.3	1985	952	0	.0	.0	12.2	5.8	27.0	1.7
Dec	36.7	10.5	23.6	74+	1998	2	32.4	1979	-39	1989	22	4.1	1983	1285	0	.0	.0	6.2	11.3	30.8	6.2
Ann	61.1	33.2	47.2	114	Jul 1990	2	78.5	Jul 1974	-39	Dec 1989	22	4.1	Dec 1983	7255	779	6.1	41.4	245.6	46.2	176.3	24.3

\+ 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

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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	.30	.25	.54	1992	7	.82	1979	.02+	1995
Feb	.48	.40	.92	2000	25	1.33	1987	.06+	1985
Mar	1.11	.98	1.59	1977	11	4.23	1977	.01	1997
Apr	1.97	1.89	2.17	1949	30	3.67	1995	.46	1980
May	3.20	3.08	3.76	1949	29	6.70	1982	.70	1985
Jun	3.01	2.67	2.96	1992	14	7.09	1983	.44	1976
Jul	3.37	2.98	3.39	1983	17	8.96	1983	.28	1980
Aug	2.20	2.21	3.23	1971	29	4.44	1992	.12	2000
Sep	1.61	1.28	2.45	1973	28	5.91	1973	.32	1975
Oct	1.22	.98	1.92	1997	12	3.85	1995	.05	1999
Nov	.72	.59	1.12	1985	15	2.62	1985	.09+	1999
Dec	.33	.23	1.23	1987	27	1.81	1987	.00+	1991
Ann	19.52	19.42	3.76	May 1949	29	8.96	Jul 1983	.00+	Dec 1991

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	4.6	.9	@	.0
Feb	4.6	1.6	.1	.0
Mar	7.0	3.1	.5	.1
Apr	9.3	4.7	1.5	.1
May	11.3	6.8	1.9	.7
Jun	10.6	5.9	2.0	.6
Jul	10.0	6.0	2.0	.9
Aug	8.0	4.3	1.2	.5
Sep	6.7	3.5	1.0	.2
Oct	5.4	2.9	.6	.1
Nov	5.0	2.1	.3	.1
Dec	4.4	1.0	@	@
Ann	86.9	42.8	11.1	3.3

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	.03	.05	.10	.14	.18	.24	.30	.37	.47	.64	.81
Feb	.06	.10	.17	.24	.31	.38	.47	.58	.73	.98	1.22
Mar	.10	.18	.33	.49	.65	.84	1.07	1.35	1.73	2.38	3.01
Apr	.47	.65	.94	1.20	1.46	1.73	2.03	2.39	2.86	3.61	4.32
May	.87	1.17	1.63	2.04	2.43	2.85	3.31	3.86	4.57	5.68	6.73
Jun	.89	1.18	1.61	1.98	2.34	2.71	3.12	3.61	4.24	5.22	6.14
Jul	.82	1.13	1.63	2.06	2.50	2.96	3.47	4.09	4.89	6.16	7.35
Aug	.45	.65	.97	1.27	1.57	1.88	2.25	2.68	3.25	4.17	5.04
Sep	.22	.36	.59	.81	1.05	1.30	1.60	1.97	2.47	3.28	4.06
Oct	.12	.20	.37	.54	.73	.94	1.18	1.49	1.92	2.63	3.32
Nov	.07	.13	.23	.33	.44	.56	.70	.88	1.13	1.53	1.93
Dec	.00	.01	.05	.10	.15	.22	.30	.40	.55	.80	1.06
Ann	11.85	13.25	15.09	16.52	17.81	19.08	20.41	21.89	23.72	26.42	28.79

\+ 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)

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median
Jan	4.7	4.3	2	1
Feb	6.2	5.2	2	1
Mar	8.1	5.9	1	1
Apr	4.3	2.1	#	1
May	.1	.0	#	0
Jun	.0	.0	#	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.7	.0	#	0
Oct	1.5	.7	#	0
Nov	6.3	5.4	1	0
Dec	5.0	3.6	1	1
Ann	36.9	27.2	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	6.7	1971	30	15.2	1982	18	1988	20	14	1988
Feb	8.3	1977	23	15.9	1978	15+	1979	10	10	1979
Mar	17.1	1977	11	51.0	1977	15+	1980	30	4	1977
Apr	8.7	1995	10	30.4	1995	12	1995	12	2	1995
May	2.6	1979	10	3.3	1979	2	1979	10	#	2000
Jun	.0	0	0	.0	0	0	0	0	#	1979
Jul	.0	0	0	.0	0	0	0	0	0	0
Aug	.0	0	0	.0	0	0	0	0	0	0
Sep	18.4	1985	28	18.4	1985	10	1985	29	1	1985
Oct	6.2	1995	23	12.4	1995	4+	1995	24	#	1997
Nov	13.5	1985	15	34.5	1985	19	1985	16	8	1985
Dec	18.3	1987	27	22.5	1987	22+	1987	29	8	1985
Ann	18.4	Sep 1985	28	51.0	Mar 1977	22+	Dec 1987	29	14	Jan 1988

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	4.2	1.4	.4	.2	.0
Feb	4.5	2.1	.7	.2	.0
Mar	4.8	2.3	.8	.5	.1
Apr	2.1	1.2	.5	.2	.0
May	.1	.0	.0	.0	.0
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.1	.1	@	@	@
Oct	1.0	.5	.1	@	.0
Nov	3.8	1.9	.8	.3	@
Dec	4.3	1.6	.3	.2	@
Ann	24.9	11.1	3.6	1.6	.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	12.7	5.8	3.4	1.7
Feb	11.9	6.3	3.6	1.4
Mar	6.8	3.1	1.8	.3
Apr	1.9	.9	.4	.1
May	@	.0	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.1	.1	.1	@
Oct	.7	.2	.0	.0
Nov	6.4	3.7	1.8	.6
Dec	11.9	5.7	3.5	.8
Ann	52.4	25.8	14.6	4.9

+ 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	6/10	6/04	5/30	5/26	5/23	5/19	5/15	5/11	5/05
32	5/24	5/19	5/16	5/13	5/10	5/08	5/05	5/01	4/27
28	5/15	5/11	5/07	5/04	5/02	4/29	4/26	4/23	4/18
24	5/09	5/04	4/30	4/27	4/25	4/22	4/19	4/15	4/10
20	4/22	4/17	4/14	4/11	4/09	4/06	4/03	3/31	3/27
16	4/16	4/11	4/07	4/03	3/31	3/28	3/25	3/21	3/15

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	9/04	9/08	9/11	9/14	9/16	9/19	9/21	9/24	9/29
32	9/12	9/17	9/20	9/22	9/25	9/27	9/30	10/03	10/07
28	9/19	9/24	9/27	10/01	10/04	10/07	10/10	10/14	10/19
24	9/24	9/30	10/04	10/07	10/10	10/14	10/17	10/21	10/27
20	10/02	10/08	10/13	10/16	10/20	10/24	10/27	11/01	11/07
16	10/13	10/18	10/22	10/25	10/29	11/01	11/04	11/08	11/13

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	138	130	125	120	116	111	107	101	94
32	154	148	144	140	137	133	130	125	119
28	176	169	163	159	154	150	145	140	132
24	191	183	178	173	168	164	159	153	145
20	216	208	203	198	194	189	185	179	172
16	232	225	219	215	211	206	202	196	189

***** 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	1386	1091	932	571	260	57	11	19	175	516	952	1285	7255
60	1215	937	768	422	141	20	1	5	84	365	810	1129	5897
57	1122	860	675	339	90	9	0	2	48	276	720	1036	5177
55	1061	808	613	287	64	4	0	1	31	220	666	974	4729
50	913	677	464	175	22	0	0	0	8	106	526	829	3720
32	433	289	82	5	0	0	0	0	0	1	152	359	1321

Base — Cooling Degree Days (1)

Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	39	85	199	435	792	1071	1299	1249	893	520	157	51	6790
55	0	0	3	36	148	386	586	537	247	40	1	0	1984
57	0	0	2	25	113	330	524	475	205	26	0	0	1700
60	0	0	1	14	71	251	432	385	149	13	0	0	1316
65	0	0	0	5	27	141	286	242	75	3	0	0	779
70	0	0	0	1	8	63	159	126	33	1	0	0	391

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	5	26	83	238	556	842	1061	1010	663	304	62	6	5	31	114	352	908	1750	2811	3821	4484	4788	4850	4856
45	0	5	37	145	405	692	906	855	518	187	26	1	0	5	42	187	592	1284	2190	3045	3563	3750	3776	3777
50	0	0	13	81	268	542	751	700	378	103	9	0	0	0	13	94	362	904	1655	2355	2733	2836	2845	2845
55	0	0	3	42	154	392	596	545	254	43	0	0	0	0	3	45	199	591	1187	1732	1986	2029	2029	2029
60	0	0	0	13	73	259	442	394	153	13	0	0	0	0	0	13	86	345	787	1181	1334	1347	1347	1347
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	16	38	89	180	348	533	680	647	427	234	69	24	16	54	143	323	671	1204	1884	2531	2958	3192	3261	3285

(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.
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