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: LANGDON EXP FARM, ND **COOP ID: 324958**

Climate Division: ND 3 **NWS Call Sign:** **Elevation: 1,615 Feet** **Lat: 48˚46N** **Lon: 98˚21W**

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	9.9	-9.1	.4	52	1942	23	14.3	1990	-50	1916	12	-13.9	1982	2004	0	.0	.0	.0	28.6	31.0	21.7
Feb	17.3	-2.1	7.6	59	2000	23	22.9	1998	-51	1936	16	-9.1	1979	1609	0	.0	.0	.1	23.2	28.2	15.4
Mar	29.4	11.0	20.2	73	1946	27	31.6	2000	-40	1948	10	10.8	1996	1389	0	.0	.0	1.5	16.0	30.4	7.3
Apr	48.3	27.2	37.8	97	1980	21	46.7	1987	-15+	1979	6	26.2	1979	818	1	.0	@	15.0	3.2	21.7	.7
May	64.8	40.3	52.6	111	1934	30	62.8	1977	6	1967	3	44.4	1979	406	19	.0	.4	28.1	@	6.8	.0
Jun	72.9	50.0	61.5	106	1933	18	71.1	1988	24	1964	1	54.4	1982	167	60	.0	1.1	29.8	.0	.1	.0
Jul	76.7	54.0	65.4	112+	1936	12	71.2	1989	31	1908	7	58.0	1992	88	100	@	1.4	31.0	.0	.0	.0
Aug	76.6	51.8	64.2	102+	1949	7	71.0	1983	28	1982	27	58.0	1977	121	97	.1	2.0	31.0	.0	.1	.0
Sep	65.6	41.3	53.5	103	1983	3	59.2	1998	15+	1965	26	48.6	1984	356	8	.1	.6	28.1	.0	4.5	.0
Oct	51.3	29.1	40.2	91	1963	4	46.3	1973	-7	1919	28	34.9	1991	768	0	.0	@	17.8	1.7	19.9	.1
Nov	30.1	12.9	21.5	74	1999	1	33.2	1999	-31	1958	29	9.7	1996	1305	0	.0	.0	2.6	16.6	29.0	5.6
Dec	15.3	-2.2	6.6	64	1939	6	22.1	1997	-42+	1917	29	-6.1	1983	1814	0	.0	.0	.0	27.5	31.0	16.7
Ann	46.5	25.4	36.0	112+	Jul 1936	12	71.2	Jul 1989	-51	Feb 1936	16	-13.9	Jan 1982	10845	285	.2	5.5	185.0	116.8	202.7	67.5

\+ 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: 1907-2001

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

Issue Date: February 2004

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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	.42	.33	.94	1982	23	1.74	1982	.00	1973
Feb	.39	.28	.82	2000	26	1.47	1987	.03+	1993
Mar	.61	.56	1.71	1971	14	2.66	1971	.10	1986
Apr	1.00	.75	2.10	1953	24	2.69	1986	.00+	1988
May	2.36	1.97	2.21	1998	15	6.29	1974	.32	1976
Jun	3.33	3.39	2.63	1909	20	7.02	1993	.52	1988
Jul	3.18	3.05	3.08	1958	4	9.19	1993	.75	1976
Aug	2.73	2.43	4.20	1979	31	7.11	1985	.44	1998
Sep	1.66	1.37	2.53	1941	4	3.95	1977	.35	1998
Oct	1.38	1.08	2.34	1949	10	4.70	1994	.11+	1999
Nov	.66	.54	1.35	2000	2	3.05	2000	.05	1987
Dec	.39	.33	1.20	1916	7	1.05	1992	.05	1983
Ann	18.11	18.69	4.20	Aug 1979	31	9.19	Jul 1993	.00+	Apr 1988

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	6.8	1.2	.1	.0
Feb	4.8	1.3	.1	.0
Mar	5.7	1.9	.1	@
Apr	5.9	2.8	.5	@
May	9.5	5.2	1.5	.4
Jun	11.3	7.3	2.0	.8
Jul	11.1	6.8	2.2	.6
Aug	9.3	5.5	1.5	.7
Sep	8.4	4.2	1.0	.3
Oct	7.5	3.1	.9	.2
Nov	6.1	2.0	.1	@
Dec	6.3	1.4	.0	.0
Ann	92.7	42.7	10.0	3.0

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	.05	.10	.16	.22	.29	.35	.43	.51	.63	.82	1.00
Feb	.02	.05	.10	.15	.21	.28	.36	.47	.62	.88	1.13
Mar	.08	.13	.22	.30	.39	.49	.60	.74	.93	1.24	1.54
Apr	.00	.00	.19	.36	.53	.72	.96	1.24	1.63	2.29	2.93
May	.54	.76	1.11	1.42	1.73	2.06	2.43	2.87	3.45	4.37	5.23
Jun	1.17	1.48	1.93	2.32	2.69	3.06	3.47	3.95	4.57	5.51	6.39
Jul	.79	1.09	1.56	1.97	2.38	2.80	3.28	3.85	4.59	5.77	6.87
Aug	.50	.74	1.14	1.51	1.89	2.30	2.76	3.32	4.07	5.27	6.41
Sep	.49	.64	.88	1.08	1.28	1.49	1.72	1.99	2.34	2.88	3.39
Oct	.10	.19	.36	.55	.77	1.01	1.30	1.67	2.19	3.06	3.92
Nov	.06	.10	.19	.28	.38	.50	.63	.80	1.03	1.42	1.81
Dec	.08	.12	.17	.22	.28	.33	.40	.47	.57	.73	.88
Ann	11.54	12.76	14.34	15.57	16.66	17.74	18.86	20.10	21.63	23.87	25.83

\+ 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: 1907-2001
(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	6.5	5.9	10	11
Feb	5.6	5.0	11	12
Mar	5.9	4.6	8	8
Apr	3.2	1.8	2	#
May	.5	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	#	.0	#	0
Oct	2.2	.8	#	0
Nov	6.6	5.5	3	3
Dec	6.2	4.6	6	5
Ann	36.7	28.2	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	6.0	1998	9	15.9	1982	26	1997	30	23	1997
Feb	5.0	1976	28	18.4	1987	28	1987	28	24	1997
Mar	11.0	1971	14	19.1	1971	29	1987	1	25	1997
Apr	18.0	1997	6	22.5	1997	26	1997	11	13	1997
May	6.0	1991	4	7.3	1991	6	1991	4	#+	1991
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	#	1995	21	#	1995	#	1995	21	#	1995
Oct	10.0	1985	8	12.0	1985	10	1985	8	1	1992
Nov	9.0	1975	11	18.1	1995	15	1996	30	10	1996
Dec	6.0	1997	30	15.7	1992	23	1996	31	18	1996
Ann	18.0	Apr 1997	6	22.5	Apr 1997	29	Mar 1987	1	25	Mar 1997

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	6.6	2.7	.6	.2	.0
Feb	4.3	2.3	.5	.1	.0
Mar	4.5	2.1	.6	.2	@
Apr	2.1	1.2	.2	.1	@
May	.2	.2	.1	@	.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	1.0	.8	.3	@	@
Nov	4.6	2.7	.7	.3	.0
Dec	5.9	2.3	.5	@	.0
Ann	29.2	14.3	3.5	.9	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	28.9	24.5	18.3	9.0
Feb	26.3	22.2	17.7	10.5
Mar	18.1	13.2	11.3	7.7
Apr	4.5	2.2	1.6	.6
May	.1	@	@	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.0	.0	.0	.0
Oct	1.2	.7	.3	@
Nov	15.1	10.4	7.3	2.0
Dec	24.6	17.5	14.9	8.2
Ann	118.8	90.7	71.4	38.0

+ 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	6/20	6/14	6/10	6/06	6/02	5/30	5/26	5/21	5/15
32	6/03	5/29	5/26	5/23	5/21	5/18	5/15	5/12	5/08
28	5/20	5/15	5/12	5/10	5/08	5/05	5/03	4/30	4/26
24	5/13	5/08	5/04	5/01	4/28	4/24	4/21	4/17	4/12
20	5/04	4/29	4/25	4/22	4/19	4/16	4/12	4/09	4/03
16	4/18	4/15	4/12	4/10	4/08	4/05	4/03	3/31	3/28

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	8/19	8/25	8/29	9/02	9/06	9/09	9/13	9/18	9/24
32	9/03	9/08	9/11	9/14	9/17	9/19	9/22	9/26	9/30
28	9/13	9/18	9/22	9/25	9/28	9/30	10/03	10/07	10/12
24	9/22	9/28	10/01	10/05	10/08	10/11	10/15	10/19	10/24
20	9/30	10/06	10/11	10/15	10/18	10/22	10/26	10/30	11/05
16	10/07	10/13	10/17	10/20	10/24	10/27	10/31	11/04	11/10

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	121	112	106	100	95	90	84	77	68
32	138	131	126	122	118	114	110	105	99
28	161	154	150	146	142	139	135	130	124
24	183	176	171	167	163	159	155	150	143
20	207	198	192	187	182	177	171	165	156
16	221	213	208	203	199	194	190	184	177

***** 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	2004	1609	1389	818	406	167	88	121	356	768	1305	1814	10845
60	1849	1469	1234	674	280	87	29	53	226	613	1155	1659	9328
57	1756	1385	1141	590	217	52	13	28	160	520	1065	1566	8493
55	1694	1329	1079	535	180	35	7	18	122	459	1005	1504	7967
50	1539	1189	926	408	104	11	0	4	51	311	855	1349	6747
32	994	710	429	97	4	0	0	0	0	27	376	815	3452

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	14	25	63	270	640	882	1034	998	642	281	61	24	4934
55	0	0	0	18	103	227	329	303	74	1	0	0	1055
57	0	0	0	13	78	184	272	252	53	0	0	0	852
60	0	0	0	7	49	130	195	183	29	0	0	0	593
65	0	0	0	1	19	60	100	97	8	0	0	0	285
70	0	0	0	0	5	20	35	38	2	0	0	0	100

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	0	2	112	426	655	803	763	428	137	10	0	0	0	2	114	540	1195	1998	2761	3189	3326	3336	3336
45	0	0	0	60	294	507	648	608	292	67	2	0	0	0	0	60	354	861	1509	2117	2409	2476	2478	2478
50	0	0	0	26	183	362	493	453	180	27	0	0	0	0	0	26	209	571	1064	1517	1697	1724	1724	1724
55	0	0	0	9	99	227	340	306	92	5	0	0	0	0	0	9	108	335	675	981	1073	1078	1078	1078
60	0	0	0	2	45	119	197	176	40	0	0	0	0	0	0	2	47	166	363	539	579	579	579	579
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	1	83	271	397	500	471	260	100	7	0	0	0	1	84	355	752	1252	1723	1983	2083	2090	2090

(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 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