

SWS Miscellaneous Publication 98

STATE OF ILLINOIS

DEPARTMENT OF ENERGY AND NATURAL RESOURCES



Local Climatological Data Summary
Champaign—Urbana, Illinois
1888—1986

by Audrey A. Bryan and Wayne M. Wendland

ILLINOIS STATE WATER SURVEY
CHAMPAIGN
SEPTEMBER 1987

LOCAL CLIMATOLOGICAL DATA FOR
URBANA-CHAMPAIGN 1888 TO 1986

Climatological Summary

Urbana has a temperate continental climate dominated by maritime tropical air from the Gulf of Mexico from about May through October, maritime polar air from the Pacific Ocean in spring, fall and winter, with short-duration incursions of continental polar air from Canada in winter. Winter high temperatures are typically in the 30s (F), where summer highs are usually in the 80s, with daily lows about 20F lower. Spring and fall are composed of winter-like and summer-like days, with rather large day-to-day fluctuations common. The greatest day-to-day changes in temperature occur in late fall, winter and early spring.

Winters are usually punctuated with 2 to 8 cold, dry arctic outbreaks, with daily lows dropping into the -10F range. They generally persist for 3 to 5 days, and are often preceded by a winter storm that can reach severe proportions. Six inches of snow, with heavy drifting and poor visibility are the characteristics of those storms. Summers are typically humid with dew points in the 60s and afternoon relative humidities also in the 60 percents. We observe about 25 days per year with temperatures greater than 90F; temperatures greater than 100F are seldom experienced.

Average (1951-80) precipitation is about 34 inches, including about 22 inches of snow, but there is great variability from one year to the next. We typically experience about 25 days with thunderstorms per year, and hail is usually observed once or twice each year. Champaign County has recorded about 25 tornadoes since 1916. Freezing precipitation (glaze) is more common here than to the north to south, with about 3 such occurrences each year; again with great year-to-year variability.

Eighty-five percent of the mean annual precipitation falls from April through September. The frost-free growing season averages about 175 days, beginning about 25 April and ending about 20 October.

AVERAGE MAXIMUM TEMPERATURE

Table with columns for YEAR (1989-2006) and months (JAN-DEC) plus ANNUAL average. Values range from 36.6 to 82.6 degrees.

AVERAGE MINIMUM TEMPERATURE

Table with columns for YEAR (1989-2006) and months (JAN-DEC) plus ANNUAL average. Values range from 20.5 to 71.5 degrees.

HEATING DEGREE DAYS

Table with columns for YEAR (1902-1903 to 1967-1968) and months (JUL, AUG, SEP, OCT, NOV, DEC, JAN, FEB, MAR, APR, MAY, JUN, ANNUAL). It lists heating degree days for each month and annual totals for each year.

COOLING DEGREE DAYS

Table with columns for YEAR (1889-1935) and months (JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DEC, ANNUAL). It lists cooling degree days for each month and annual totals for each year.

MONTH	TEMPERATURE							MEAN DEGREE DAYS			PRECIPITATION						
	MEANS			EXTREMES				HEATING BASE 65°F	COOLING BASE 65°F	GROWING BASE 50°F	AVERAGE TOTAL	MAXIMUM MONTHLY	YEAR	MINIMUM MONTHLY	YEAR	MAXIMUM IN 24 HOURS	YEAR
	DAILY MAXIMUM	DAILY MINIMUM	DAILY AVERAGE	RECORD HIGHEST	YEAR	RECORD LOWEST	YEAR										
JAN	32.3	17.0	24.7	70	1909	-24	1985	1249	0	1	1.97	7.62	1950	0.06	1986	2.17	1982
FEB	37.3	21.3	29.3	71	1972	-25	1889	1000	0	2	1.88	5.80	1909	0.15	1947	1.78	1939
MAR	47.8	30.4	39.1	85	1907	-5	1906	803	0	28	3.32	8.35	1922	0.38	1910	4.28	1939
APR	62.6	41.9	52.3	91	1930	15	1899	381	0	158	3.84	9.55	1964	0.50	1899	3.73	1964
MAY	73.5	52.0	62.8	97	1934	24	1891	155	34	410	3.59	11.20	1943	0.22	1925	4.61	1921
JUN	82.8	60.9	71.9	103	1934 ²	34	1894	18	120	664	3.92	10.98	1902	0.47	1936	4.00	1968
JUL	85.5	64.8	75.2	109	1954	41	1904	0	177	788	4.35	10.96	1971	0.47	1916 ³	3.98	1962
AUG	83.6	62.8	73.2	101	1901 ⁴	37	1893	0	123	726	3.66	10.01	1977	0.06	1898	3.90	1924
SEP	78.3	55.5	66.9	102	1899	24	1899	57	43	514	3.02	9.76	1926	0.25	1954	4.07	1931
OCT	66.2	44.4	55.3	93	1954	12	1895	320	6	218	2.51	9.01	1941	0.16	1964	3.66	1955
NOV	49.8	33.2	41.5	80	1950	-5	1950	705	0	40	2.48	10.08	1985	T	1904	4.07	1936
DEC	37.6	23.3	30.5	70	1948	-20	1983	1070	0	3	2.50	6.63	1967	0.05	1890	2.91	1966

Mean data representative of 1951-1980. Extreme based on 1889-1987.

¹ Also occurred in 1914.

² Also occurred in 1953.

³ Also occurred in 1930.

⁴ Also occurred in 1918; 1936; and 1964.

** Less than once in 2 years.

	JANUARY			FEBRUARY			MARCH			APRIL			MAY			JUNE		
	DIR	SPEED	GUST	DIR	SPEED	GUST	DIR	SPEED	GUST	DIR	SPEED	GUST	DIR	SPEED	GUST	DIR	SPEED	GUST
1971	W	8.4	56	S	10.3	65	NW	10.2	63	S	8.8	50	S	7.5	48	SW	6.5	43
1972	S	8.5	52	SW	8.2	44	N	8.9	47	S	8.2	40	NE	5.8	51	N	6.0	37
1973	SW	8.7	47	NW	6.9	39	NE	8.6	51	SW	8.5	48	SW	7.8	47	SW	6.7	41
1974	SW	6.9	71	NW	9.0	53	SW	8.5	53	S	9.1	47	SE	6.8	54	SW	8.4	56
1975	SW	9.0	60	NW	9.0	54	SE	8.2	57	SE	8.8	50	SW	6.1	47	SW	6.3	43
1976	W	8.7	42	SW	10.2	43	S	9.8	56	S	7.4	45	SW	6.9	49	SW	6.0	47
1977	W	8.4	46	SW	7.7	49	SE	8.6	59	SW	7.7	53	SW	5.2	60	SW	5.8	36
1978	W	8.5	57	N	5.3	34	NE	7.5	39	E	8.3	43	E	7.2	45	S	6.3	37
1979	W	6.2	36	SE	5.8	40	SE	6.0	41	NE	6.4	40	SE	5.4	37	S	5.2	31
1980	NW	6.7	55	NW	6.1	51	NE	8.1	44	NE	7.2	58	NE	4.9	43	S	4.8	46
1981	NW	6.8	36	S	8.4	41	SW	7.3	48	S	8.7	52	N	7.1	40	SW	6.0	55
1982	NW	8.6	54	NE	6.6	37	NW	8.3	49	NW	7.6	65	S	4.6	44	SW	5.3	36
1983	NW	6.5	40	SE	5.8	33	SE	7.0	32	SW	7.1	45	SE	6.9	48	SE	4.9	28
1984	S	7.9	34	S	8.0	41	E	8.2	38	E	19.0	53	S	7.1	40	S	6.9	57
AVG. (1951-1980)	W	8.1	71	S	8.2	65	S	8.6	63	S	8.5	65	S	7.0	60	SSW	6.0	65

Max gust from 1951-1984 data.

AVERAGE TOTAL	SNOW				MEAN NUMBER OF DAYS													MONTH
	MAXIMUM MONTHLY	YEAR	MAXIMUM IN 24 HOURS	YEAR	TEMPERATURE				PRECIP. 0.1 INCH OR MORE	PRECIP. 0.50 INCH OR MORE	PRECIP. 1.00 INCH OR MORE	THUNDER- STORMS	HAIL	SLEET	WINDS 30 mph AND ABOVE	FOG		
					MAX		MIN											
					90 AND ABOVE	32 AND BELOW	32 AND BELOW	0 AND BELOW										
7.2	28.3	1979	11.4	1982	0	15	28	4	4	1	0	1	**	2	7	4	JAN	
6.1	18.5	1905 ¹	11.0	1912	0	9	24	1	4	1	0	1	**	2	7	3	FEB	
5.0	32.0	1906	14.0	1906	0	3	19	0	7	2	1	3	1	1	11	4	MAR	
0.6	8.0	1920	6.0	1920	0	0	4	0	7	2	1	5	1	**	11	2	APR	
0.0	2.5	1929	2.5	1929	1	0	0	0	7	3	1	6	1	0	8	3	MAY	
0	0		0		6	0	0	0	6	3	1	7	1	0	5	1	JUN	
0	0		0		8	0	0	0	6	3	1	7	**	0	3	2	JUL	
0	0		0		5	0	0	0	6	3	1	7	**	0	2	4	AUG	
0	T	1942	0		3	0	0	0	5	2	1	4	**	0	3	3	SEP	
0	2.5	1925	2.0	1925	0	0	3	0	5	1	1	2	**	**	4	3	OCT	
2.9	11.2	1932	9.1	1980	0	2	15	0	5	2	1	1	**	1	7	3	NOV	
4.6	20.0	1983	9.5	1973	0	9	25	1	5	1	0	1	0	3	7	5	DEC	

JULY			AUGUST			SEPTEMBER			OCTOBER			NOVEMBER			DECEMBER			ANNUAL		
DIR	SPEED	GUST	DIR	SPEED	GUST	DIR	SPEED	GUST	DIR	SPEED	GUST	DIR	SPEED	GUST	DIR	SPEED	GUST	DIR	SPEED	GUST
S	5.3	41	NE	5.0	42	S	5.8	46	S	5.7	52	S	7.7	44	S	7.7	81	S	7.5	81
S	5.4	36	SW	5.6	56	NW	6.7	49	SW	6.5	32	NW	6.6	39	NW	6.9	40	SW	6.9	52
SW	5.4	54	SW	5.0	40	SE	5.1	30	SW	5.5	36	SW	7.3	43	SE	7.8	57	SW	7.0	57
SW	6.3	31	SW	4.4	47	SW	5.4	36	SW	6.7	40	SW	7.2	37	SW	7.1	38	SW	7.2	71
SW	4.3	39	SW	4.9	42	SW	4.7	39	S	6.5	38	SW	7.8	50	S	7.9	52	SW	7.0	60
SW	4.9	48	SW	4.4	27	SW	5.0	40	SW	5.6	38	NW	7.5	43	SW	8.2	39	SW	7.1	56
SW	5.5	43	SW	5.0	59	SW	5.3	33	SW	6.2	33	NE	7.7	44	S	9.2	49	SW	6.9	60
SW	5.2	39	SE	4.4	50	SW	5.2	30	SW	6.5	39	NE	7.1	47	SW	8.8	43	SW	6.7	57
NE	3.5	30	SW	4.2	33	SW	3.3	21	SW	6.3	39	NW	6.7	48	S	7.4	57	SW	5.7	57
SW	5.0	35	S	4.5	36	S	4.0	34	SW	5.2	36	SW	7.0	48	S	6.1	44	S	5.8	58
NE	4.3	39	SW	4.7	39	SW	5.8	47	SE	6.8	53	SE	6.2	54	NW	6.9	40	SW	6.6	55
SW	4.8	33	SW	4.0	47	S	4.0	28	S	4.6	44	S	9.5	45	S	6.6	47	S	6.0	65
SW	5.2	36	NE	4.5	30	S	4.8	31	S	6.4	37	S	8.6	43	SW	8.3	41	S	6.3	48
S	5.6	33	S	5.1	23	S	6.5	35	S	5.4	33	S	7.6	36	S	8.1	43	S	7.1	57
SW	5.0	61	SW	4.8	66	SSW	5.2	52	SW	6.3	53	S	7.8	70	S	8.1	81	SW	7.0	81

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
7am Relative Humidity (percent) ¹	84 (3.8)	84 (3.7)	83 (3.0)	79 (4.1)	79 (4.5)	80 (3.7)	83 (4.0)	87 (4.9)	87 (6.1)	83 (5.7)	85 (3.0)	86 (3.7)	83
7pm Relative Humidity (percent) ¹	78 (6.1)	75 (4.6)	70 (5.7)	62 (7.2)	59 (8.0)	59 (7.3)	63 (7.0)	69 (8.4)	62 (6.1)	63 (8.1)	73 (5.2)	80 (6.0)	68
Evaporation ² (inches/month)				4.25 (0.69)	6.00 (1.13)	7.02 (1.42)	7.27 (1.27)	6.21 (1.07)	4.78 (0.74)	3.50 (1.26)			
Mean Solar Radiation ³ (mega joules meter ⁻² day ⁻¹)	6.8	9.6	11.4	15.7	19.4	21.9	21.7	19.6	15.9	10.7	6.5	5.2	13.7
Maximum Solar Radiation ³ (mega joules meter ⁻² day ⁻¹)	12.9	19.0	23.7	27.8	31.0	32.1	31.3	28.8	24.5	20.0	13.9	11.7	32.1
Clear Days	8	7	7	7	9	9	10	10	11	12	8	7	105
Partly Cloudy Days	8	9	9	10	12	13	14	14	10	9	8	8	124
Cloudy Days	15	12	15	13	10	8	7	7	9	10	14	16	136
Mean Maximum 4 Inch Soil Temperature ⁴ (°F) ¹	33 (2.7)	34 (2.8)	42 (3.9)	55 (2.4)	66 (3.1)	76 (2.3)	81 (2.3)	78 (2.0)	72 (2.1)	60 (2.9)	48 (2.7)	38 (3.0)	57
Mean Minimum 4 Inch Soil Temperature (°F) ¹	31 (2.3)	32 (1.9)	38 (3.2)	49 (2.3)	60 (3.0)	69 (2.1)	74 (1.7)	73 (1.4)	67 (1.9)	54 (2.8)	45 (2.4)	35 (2.3)	52
Mean Maximum 8 Inch Soil Temperature (°F) ¹	34 (2.5)	34 (2.7)	41 (3.8)	53 (2.5)	64 (2.6)	73 (1.8)	78 (1.4)	76 (2.1)	71 (2.1)	61 (2.6)	50 (2.5)	40 (2.9)	56
Mean Minimum 8 Inch Soil Temperature (°F) ¹	34 (2.4)	34 (2.4)	40 (3.5)	51 (2.2)	61 (2.7)	70 (1.6)	75 (1.5)	74 (2.1)	70 (1.9)	59 (2.6)	48 (2.3)	39 (2.6)	51

¹ Numbers in parenthesis are standard deviations

² Means based upon pan evaporation

³ Period of Record 1981-1984, Bondville

⁴ Period of record 1960-1986

ACKNOWLEDGEMENTS

The authors thank Ms. Debra Mitchell for typing of tables, and Mr. John Brother for preparation of table headings.

A more complete history of the Morrow Plots weather station was prepared by Stanley A. Changnon, Jr. and was published by the Water Survey as Circular 88. This summary was prepared by Audrey Bryan, Observer, and Wayne M. Wendland, Illinois State Climatologist at the Water Survey. Copies are available at no cost from the Illinois State Water Survey, 2204 Griffith Drive, Champaign, IL 61820.