

THE CLIMATE OF ILLINOIS IN THE 1970s

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ABSTRACT

The climate of Illinois for the 10-year period of 1971 through 1980 is investigated for departures from longer-term means of temperature, precipitation, snowfall and growing season. Ten-year (1971-1980) averages for these climatic parameters are computed for the nine state climatic divisions and six stations with long-term climate data. Trends in the climatic parameters studied are identified by analyzing the departures of the 10-year period from the long-term means. The 125-year period of recorded climate data at Peoria, Illinois is studied to gain insight into longer climate fluctuations. The departures from 30-year and long-term climate data exhibited by the climate of the 1970s show that Illinois has moved into a cooler and wetter climatic regime. The consequences and impacts of a continuation of this cooler and wetter climate are examined.

INTRODUCTION

During the 1970s the State of Illinois experienced some of its most damaging and costly weather extremes on record. The period between 1971 and 1980 is deserving of further climatic study because occurrences of extreme weather during that period may signal the beginning of a shift in climatic regimes. Climatologists often use records of the past to help determine what type of climate can be expected in the future, an example being a study of an apparent 10-year climate shift done by H. H. Lamb (1966).

A brief review of some weather events of the 1970s help to set the stage. Diaz and Quayle (1980) studied three successive severe winters in the United States beginning with the 1976-1977 season, an event which has no parallel in the modern historical record. Even before these cold and snowy winters, it was perceived that the climate was abnormally fluctuating. The 1972-1975 period was the wettest four consecutive years on record in Urbana (Chaugnon, 1976), and was much above normal in precipitation in most of the State. Annual rainfall totals generally were in excess of normal, except for mild droughts occurring in 1976-1977 and 1980-1981. With the exception of 1980, generally cool and wet summers prevailed. Snowfall was well above normal, with the exception of the mild winters of 1970-1971 and 1972-1973. Temperatures generally averaged below normal, especially in January when departures from normal were greatest, and the economic losses were most severe.

METHODS OF ANALYSIS

Ten-year means of temperature, precipitation, snowfall and length of growing season were computed from 1971 through 1980. These means were computed for each Illinois crop district and for six stations with long-term climate data (St. Louis, Cairo, Chicago, Urbana, Peoria, and Springfield). The normals chosen for the 9 crop districts were the 30-year (1941-1970) means, whereas those normals for the six stations were computed by averaging data from the beginning of their record through 1970. Snowfall normals at 10 NWS stations were computed from 1940-1941 through the 1969-1970 snowfall season. Normal growing seasons studied for 25 Illinois stations were based on data from 1931 through 1960.

Monthly and annual departures of the 10-year (1971-1980) average temperature and precipitation from the 30-year means were computed for each crop-district. Monthly and seasonal departures from normal snowfall were examined for those selected 10 NWS stations with 30-year normals. The difference in length of growing season between 30-year (1931-1960) normal and the 1971-1980 mean was computed for each of 25 NWS stations. Temperature and precipitation data were then examined for the six stations chosen (St. Louis, Cairo, Chicago, Urbana, Peoria, and Springfield). Monthly and annual departures of temperature and precipitation from normal were computed for these stations.

Peoria's 125-year period of record is the longest unbroken climatic record in Illinois. Ten-year moving averages of January and July temperature were computed for the entire period of record. A 5-year moving average was computed for June through August precipitation totals, and annual amounts were plotted along with the smoothed 5-year averages. These moving averages over the length of record were studied either to find similar climate variations in the past, or to illustrate the uniqueness of the climate of the 1970s.

PRECIPITATION TRENDS

Statewide precipitation during the 1970s shows above normal departures from the 1941-1970 mean in March, August, and December (Table 1). Departures below the 1941-1970 mean occur at nearly all crop-reporting districts for January and October (Table 2). July precipitation amounts play a large role in determining the yield of the large cash grain crops grown in Illinois. The 10 year (1971-1980) July means proved to be well above normal for the eastern and east-southeastern districts and below normal in the western and northwestern crop districts (Table 1). The greatest average positive precipitation departure from the 30-year normal occurred in March and the greatest negative departure occurred in January (Table 1). The 1971-1980 average annual precipitation for Illinois was slightly greater than the 30-year total annual precipitation, with the greatest positive departures of precipitation in the northern and eastern sections of Illinois (Table 1 and Figure 1).

Of the six stations chosen with long term climate data, St. Louis and Springfield had the greatest negative 1971-1980 precipitation departure with Cairo showing the largest positive departure (Table 3). Monthly precipitation departures at these stations show that the July departure of 1.83 inches at Urbana was the greatest above normal departure and the June departure of 1.49 inches at St. Louis was the greatest monthly negative departure (Table 3). The monthly departures of precipitation for all stations were above normal in March and December, and at or below normal for every station in January. The below normal total annual departures in

Springfield and St. Louis further illustrate a trend towards slightly below average precipitation in southwestern Illinois as compared to the above average 10-year (1971-1980) trend in the rest of Illinois (Figure 1). The below average decadal values in southwestern Illinois can be attributed to the fact that both the 1976-1977 and 1980-1981 droughts were centered in that area.

TEMPERATURE TRENDS

Analysis of monthly mean temperature data shows the January 10-year (1971-1980) monthly averages at each crop district to be well below the 30-year normal (Table 4). March was the only month found to have temperature departures above the 30 year normal in each crop district. The west-southwest district had the largest monthly below normal departure in January, whereas the largest monthly above normal departure occurred in March at the northwest district (Table 5). The annual average for all 9 crop reporting districts show the 10-year (1971-1980) averages to be below the 30-year mean (Figure 1). The areal pattern of change that appears to have occurred, when viewed in conjunction with the precipitation data, is that of cooler and slightly drier in the southwestern part of Illinois and cooler and wetter in the northern and eastern sections of Illinois.

The 1971-1980 temperature data at the six selected stations revealed that four of the six stations experienced below normal annual average temperature. St. Louis had the largest below normal annual departure, and Cairo the greatest above normal departure (Table 6). The largest monthly below normal departure of the 10-year average from the 30-year normal occurred at St. Louis in January, and the largest above normal departure occurred at Chicago in May (Table 6). The temperature departures found at the six stations are consistent with the departures found at the crop-districts which indicated larger negative departures in the southwest. The apparent geographical distribution of colder temperature departures in the west-southwest and southwestern crop districts is shown by St. Louis and Peoria having the largest annual below normal temperature departures. March departures from the 30-year normals were at or above normal at all stations except at Peoria.

SNOWFALL TRENDS

Increased snowfall during the 1970s in Illinois has been one of the more apparent changes in climate. All of the 10 stations studied showed heavier total snowfall than during the prior 30 years (1941-1970), as shown in Table 7. The positive departures ranged from 13% at Cairo to 61% at St. Louis, with most stations showing increases of 30 to 40%.

The greatest monthly increase in snowfall occurred at Chicago Midway in January, and the greatest decrease occurred at Dubuque in March (Table 8). January snowfall showed the largest increase at most stations, with only Rockford showing a small decrease in snowfall for that month. March appeared to be the only month of the snow season that showed a slight decrease from the 30-year mean.

GROWING SEASON TRENDS

The growing season is defined as the number of days between the last occurrence of 32°F (0°C) in the spring and the first occurrence of 32°F (0°C) in the fall. Thirteen of the twenty-five stations studied showed a decrease in length of

growing season, 2 showed no change, and 10 showed an increase over the 30-year (1931-1960) mean (Table 9). Although care was taken in selecting sites that have essentially unchanged locales, it must be noted that a change in only a few miles, or growth of the surrounding urban area, can result in substantial differences in recording the first or last day of 32°F (0°C).

The 1971-1980 growing season average of all 25 stations is slightly greater than 2 days shorter than the 1931-1960 normal. The largest negative departure was at Chicago Midway (13 days shorter than normal), and the largest positive departure was at Cairo (9 days longer than the 30-year normal). The northern and southern third of Illinois experienced a slightly shorter growing season during the 1970s while the central part of Illinois has experienced a slightly longer growing season (Figure 1). The 1971-1980 length of growing season averages give little indication of any significant shift or trend. The trend toward colder October's, however, indicates a slightly greater risk of an early freeze. The season appears to be shifting toward earlier in the year since the 10-year (1971-1980) March average temperatures are warmer indicating a reduced risk of a late spring freeze.

LONG-TERM TRENDS AT PEORIA

Peoria's long-term temperature data exhibits the same long-term trends of many stations in the northern hemisphere (Mitchell, 1961). Due to the spatial variability of summertime precipitation, Peoria's long-term summer precipitation totals can only roughly estimate north central Illinois' summer precipitation data. Ten-year moving averages of January temperature, beginning with the 1856 through 1865 average, indicate that the current sharp decline that began with the 1952-1961 temperature average has no precedent in Illinois recorded climate history (Figure 2). The most recent decline in July temperature is similar to a decline that began in the late 1890's (Figure 3). The latest decline may have ended since the July 10-year moving average is currently showing an increase in average temperature.

The 5-year moving averages of Peoria summer precipitation indicate an increase in the most recent (1977-1981) 5-year mean similar to other increases found in the Peoria record (Figure 4). The current "peak" follows closely a peak in the 5-year moving averages that occurred in the mid 1970s. The more recent annual 3 month totals do not show the extremely low amounts of precipitation experienced in some years prior to 1940. The absence of extremely low summer precipitation amounts after 1940 is also illustrated in the 5-year average showing no sharp declines comparable to those prior to 1940.

IMPACTS OF RECENT CLIMATE FLUCTUATIONS

Can we say that the climatic fluctuation of the 1970s were temporary in nature? There are no physical-dynamic methods to predict weather one year in advance, therefore past weather records may be used as predictors for the next year. Lamb and Changnon (1981) have concluded that the average of the conditions in the previous 5 years is the best predictor of the next year's temperature and precipitation in Illinois. By anticipating a continuation of the trends identified in the previous years weather, we can be more prepared to deal with their effects.

The relationship between climate and crop production is well documented, and is crucial to the Illinois economy. The recent near or above average rainfall in July and August in Illinois bodes well for continued high yields of the major cash

grain crops. There was no significant departure of temperature from the 30-year normal during the growing season. Although a slight downward departure from the 1931-1960 normal in growing season was indicated, no significant trend was noted. The trend toward colder October's indicates a slight risk of early frost damage, but a warmer March signals a slightly less chance of frost damage to crops in early spring.

The climate of the 1970s has had a profound effect on the amount of resources needed by utility companies to provide service. The downward trend in January and February mean temperatures combined with the higher costs of fossil fuels incurred in the 1970s, has drastically increased the amount of money spent by businesses and residences on energy. The continuation of the trend toward colder winters makes the search for alternate energy sources economically appealing. The possibility of the exploitation of wind and solar power has been investigated by Wendland (1981) and Hendrie (1981) as part of a research program conducted by the Illinois State Water Survey.

The large increases in snowfall experienced at most stations in Illinois during the 1970s, has presented local and state governments charged with snow removal and road repair with another financial burden. A continuation of the trend toward heavier snowfalls would mean that budgets for road-salt and snow removal must be increased. When the possibilities of large snowfalls are ignored, communities are faced with looking for snow removal funds from other sources since they find themselves over-budget before the snowfall season is over. The combination of extended periods of sub-freezing weather and heavier than normal snowfalls has also increased road repair costs. This is another financial burden that state and local governments must expect to remain high *if* the trend toward colder and snowier winters continue.

The climate of the 1970s gives a strong indication of greater flood risk along Illinois rivers. The two factors that have enhanced the flood risk are the trends toward increased snowfall and a warmer and wetter March. March flooding due to the melting of the snow pack in Illinois and areas upstream from the state is a near-annual occurrence. Flood severity is determined by the amount of the snow pack, thickness of river ice, rate of melting of both the snow pack and river ice, and precipitation accompanying the melting. The colder and snowier trend of recent winters has increased snow pack and the thickness of river ice. The trend toward a warmer and wetter March can have the effect of melting this snow pack rapidly in conjunction with increased precipitation during the melt. During the 1970s flooding became a more severe problem. The March floods of 1979 set records at many locations in Illinois, and some localized severe flooding was experienced again in 1981. Flood prone communities should take steps to deal with annual flooding problems that recent climate history indicate may remain severe.

SUMMARY

This paper has documented some of the changes in climate that occurred in Illinois during the period of 1971 through 1980. It is possible that these changes may persist into the 1980s. For example, the severe winter of 1981-1982 paralleled in many ways the severe winters of the 1970s, and the cool-wet summers of 1981 and 1982 were similar to the conditions in the 1971-1980 period.

The above trends suggest that industries and communities most effected by the recent weather changes should be prepared for these changes to persist into the

1980s. Knowledge of shifts and developing trends in climate is needed to help mitigate climate related problems (Changnon and Semonin, 1982). The climate of the 1970s has increased public awareness that these problems exist and need to be addressed.

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TABLE 1. Illinois Monthly Average Precipitation

	10 YEAR AND 30 YEAR MEANS (INCHES)		
	<u>1971-1980</u>	<u>1941-1970</u>	<u>(DEP)</u>
Jan	1.88	2.18	(-0.30)
Feb	1.82	1.98	(-0.16)
Mar	3.94	3.12	(+0.82)
Apr	3.80	3.99	(-0.19)
May	3.94	4.16	(-0.22)
Jun	3.96	4.38	(-0.42)
Jul	3.87	3.84	(+0.03)
Aug	4.11	3.69	(+0.42)
Sep	3.33	3.37	(-0.04)
Oct	2.51	2.80	(-0.29)
Nov	2.75	2.58	(+0.17)
Dec	2.86	2.30	(+0.56)

ILLINOIS AVERAGE TOTAL ANNUAL PRECIPITATION

<u>1971-1980</u>	<u>1941-1970</u>	
38.77	38.39	(+0.38)

JULY CHOP-DISTRICT PRECIPITATION 10 YEAR AND 30 YEAR MEANS (INCHES)

	<u>1971-1980</u>	<u>1941-1970</u>	<u>(DEP)</u>
NW	3.56	4.13	(-0.57)
NE	3.66	3.84	(-0.18)
W	3.49	4.09	(-0.60)
C	3.93	3.67	(+0.26)
E	4.29	4.01	(+0.28)
WSW	3.38	3.77	(-0.39)
ESE	4.62	3.69	(+0.93)
SW	3.92	3.58	(+0.34)
SE	4.00	3.83	(+0.17)

TABLE 2. Monthly Crop District Precipitation Departures of 10 Yr (1971-1980) Averages From 30 Yr (1941-1970) Means (In)

	<u>Northwest Departure</u>	<u>Northeast Departure</u>	<u>West Departure</u>	<u>Central Departure</u>
Jan	-0.13	-0.10	-0.25	-0.28
Feb	+0.06	-0.10	0.00	-0.11
March	+0.55	+0.46	+0.77	+0.86
April	+0.25	+0.24	-0.26	-0.77
May	+0.30	+0.24	+0.26	-0.03
June	+0.05	+0.26	-1.17	-0.22
July	-0.57	-0.18	-0.60	+0.26
Aug	+1.08	+1.56	+0.53	+0.64
Sep	-0.38	+0.36	+0.19	-0.10
Oct	-0.31	-0.32	-0.06	-0.15
Nov	0.00	-0.05	+0.46	+0.53
Dec	+0.58	+0.80	+0.58	+0.52

	<u>East Departure</u>	<u>West-Southwest Departure</u>	<u>East-Southeast Departure</u>	<u>Southwest Departure</u>	<u>Southeast Departure</u>
Jan	-0.13	0.00	-0.52	-0.71	0.67
Feb	-0.15	0.07	-0.19	-0.50	-0.36
March	+0.95	+1.37	+0.96	+0.85	+0.72
April	-0.78	-0.44	-0.44	-0.17	+0.28
May	-0.55	-0.24	-0.55	-0.89	-0.69
June	+0.48	-0.84	-0.47	-1.11	-0.74
July	+0.28	-0.40	+0.93	+0.34	-0.06
Aug	+1.62	+0.14	+0.88	+0.57	+0.76
Sep	+0.49	-0.14	-0.13	-0.66	-0.07
Oct	-0.54	-0.47	-0.21	-0.42	-0.13
Nov	+0.02	+0.06	-0.11	+0.51	-0.76
Dec	+0.72	+0.72	+0.50	+0.30	+0.25

TABLE 3. Monthly And Annual Station Precipitation Departures of 10 Yr (1971-1980) Averages From 30 Yr (1941-1970) Mean (In)

	St. Louis	Cairo	Chicago
Jan	-0.28	-0.99	-0.0
Feb	-0.29	-0.28	-0.29
March	+0.80	+0.94	+0.68
April	-0.58	+0.40	+1.07
May	-0.87	+0.16	-0.41
June	-1.49	+0.03	+0.36
July	-0.12	+1.48	+0.12
Aug	-0.56	+1.73	+1.33
Sep	-0.29	-0.12	+0.50
Oct	-0.72	-0.01	-0.52
Nov	+0.11	+0.73	-0.32
Dec	+0.15	+0.76	+1.31

(ANN)	<u>30 YR</u>	<u>10 YR</u>	(DEP)	<u>30 YR</u>	<u>10 YR</u>	(DEP)	<u>30 YR</u>	<u>10 YR</u>	(DEP)
	38.73	34.59	(-4.14)	43.09	48.10	(+5.01)	33.22	37.38	(+4.16)
				Urbana	Peoria		Springfield		
Jan				-0.31	-0.36		-0.38		
Feb				+0.02	-0.12		-0.15		
March				+0.91	+0.48		+1.53		
April				-0.62	+0.01		-0.45		
May				-0.27	+0.11		-0.34		
June				-0.08	+0.85		-0.62		
July				+1.83	+0.03		-0.41		
Aug				+1.75	+0.09		+0.78		
Sep				+0.40	-0.28		-0.34		
Oct				-0.33	+0.30		-1.03		
Nov				-0.01	-0.17		-0.49		
Dec				+0.90	+0.67		+0.54		
(ANN)	<u>30 YR</u>	<u>10 YR</u>	(DEP)	<u>30 YR</u>	<u>10 YR</u>	(DEP)	<u>30 YR</u>	<u>10 YR</u>	(DEP)
	35.88	40.07	(+4.19)	34.90	36.25	(+1.35)	35.47	34.11	(-1.36)

TABLE 4. Illinois Monthly Average Temperature

	10 YEAR AND 30 YEAR MEANS (°F)		
	1971-1980	1941-1970	(DEP)
Jan	23.0	27.5	(-4.5)
Feb	28.3	31.1	(-2.8)
Mar	41.3	40.2	(+1.1)
Apr	53.0	53.5	(-0.5)
May	62.7	63.3	(-0.6)
Jun	72.1	72.6	(-0.5)
Jul	75.9	75.9	(0.0)
Aug	73.7	74.2	(-0.5)
Sep	67.0	67.1	(-0.1)
Oct	55.0	56.7	(-1.7)
Nov	42.1	42.4	(-0.3)
Dec	30.8	31.0	(-0.2)

ILLINOIS AVERAGE ANNUAL TEMPERATURE

<u>1971-1980</u>	<u>1941-1970</u>	(-0.9)
52.1	53.0	

JANUARY CROP-DISTRICT TEMPERATURE
10 YEAR AND 30 YEAR MEANS (°F)

	1971-1980	1941-1970	DEP
NW	17.2	21.7	(-4.5)
NE	19.1	23.3	(-4.2)
W	21.1	25.3	(-4.2)
C	21.1	25.7	(-4.6)
E	21.3	26.0	(-4.7)
WSW	23.9	28.8	(-4.9)
ESE	25.1	29.7	(-4.6)
SW	28.5	33.3	(-4.8)
SE	29.3	33.5	(-4.2)

TABLE 5. Monthly Crop District Temperature Departures of 10 Yr (1971-1980) Averages From 30 Yr (1941-1970) Means (°F)

	<u>Northwest Departure</u>	<u>Northeast Departure</u>	<u>West Departure</u>	<u>Central Departure</u>
Jan	-4.5	-4.2	-4.2	-4.6
Feb	-1.7	-2.4	-2.7	-2.8
March	+1.5	+0.5	+1.3	+1.3
April	+0.7	-0.9	0.0	-0.3
May	+0.2	-0.1	-0.1	-1.6
June	-0.1	-0.5	-0.3	-0.4
July	-0.6	-0.1	+0.2	-0.1
Aug	-1.0	-0.8	-0.9	-0.7
Sep	-0.2	-0.2	0.0	+0.2
Oct	-2.1	-1.9	-1.8	-1.6
Nov	-0.6	-0.1	-0.3	-0.1
Dec	-1.1	-0.6	-0.6	-0.1

	<u>East Departure</u>	<u>West-Southwest Departure</u>	<u>East-Southeast Departure</u>	<u>Southwest Departure</u>	<u>Southeast Departure</u>
Jan	-4.7	-4.9	-4.6	-4.8	-4.2
Feb	-3.0	-3.5	-3.3	-3.6	-2.7
March	+1.1	+1.0	+1.3	+1.0	+1.3
April	-0.5	-0.5	-0.5	-1.1	-1.0
May	+9.2	-0.8	-0.6	-1.3	-1.2
June	+0.4	-1.0	-0.9	-1.0	-1.0
July	-0.2	-0.2	-0.2	+0.1	0.0
Aug	-0.3	-1.0	-0.5	-0.7	-0.6
Sep	+0.2	-0.4	0.0	-0.4	-0.1
Oct	-1.7	-1.8	-1.6	-1.8	-1.6
Nov	+0.1	-1.9	+0.2	-0.4	+0.4
Dec	0.0	-0.4	+0.5	+0.5	+0.2

TABLE 6. Monthly and Annual Station Temperature Departures of 10 Yr (1971-1980) Averages From 30 Yr (1941-1970) Mean (°F)

	<u>St. Louis</u>			<u>Cairo</u>			<u>Chicago</u>		
Jan			-5.5			-3.2			-4.0
Feb			-2.7			-9.9			-1.3
March			-0.1			+1.4			+1.5
April			-0.3			+1.2			+0.8
May			-1.0			+0.8			+1.7
June			-0.7			+1.6			+1.5
July			0.6			+0.5			+1.4
Aug			-0.7			+0.3			+1.2
Sep			-1.1			+0.5			+0.2
Oct			-1.8			+0.3			-0.8
Nov			-1.1			+0.9			+0.4
Dec			-1.7			+0.5			-0.5
(ANN)	<u>30 Yr</u>	<u>10 Yr</u>	(DEP)	<u>30 Yr</u>	<u>10 Yr</u>	(DEP)	<u>30 Yr</u>	<u>10Yr</u>	(DEP)
	56.4	55.0	-1.4	58.4	58.9	(+0.5)	49.5	49.9	+0.4
	<u>Urbana</u>			<u>Peoria</u>			<u>Springfield</u>		
Jan			-4.1			-5.0			-4.7
Feb			-1.4			-2.9			-2.5
March			+1.0			-0.7			+0.6
April			+0.5			+0.4			+0.4
May			-0.9			-0.4			-0.1
June			+0.1			-0.6			+0.2
July			+0.4			-0.7			-0.6
Aug			-0.6			-0.5			-0.7
Sep			-0.3			-0.2			-0.3
Oct			-1.0			-0.2			-0.9
Nov			+0.5			-0.1			0.0
Dec			-0.1			-1.1			-0.8
(ANN)	<u>30 Yr</u>	<u>10 Yr</u>	(DEP)	<u>30 Yr</u>	<u>10 Yr</u>	(DEP)	<u>30 Yr</u>	<u>10 Yr</u>	(DEP)
	51.7	51.4	-0.3	50.9	50.0	-0.9	53.2	52.4	-0.8

TABLE 7. Seasonal Snowfall

30 YR (1940-41 - 1969-70)						
10 YR (1970-71 - 1979-80)						
(IN)						
	Rockford			Chicago		
<u>30 YR</u>	<u>10 YR</u>	(DEP)	<u>30 YR</u>	<u>10 YR</u>	(DEP)	
34.5	41.1	(+6.6)	39.5	54.0	(+14.5)	
	Moline			Peoria		
<u>30 YR</u>	<u>10 YR</u>	(DEP)	<u>30 YR</u>	<u>10 YR</u>	(DEP)	
30.3	42.1	(+11.8)	23.2	31.2	(+8.0)	
	Urbana			Springfield		
<u>30 YR</u>	<u>10 YR</u>	(DEP)	<u>30 YR</u>	<u>10 YR</u>	(DEP)	
23.1	29.4	(+6.3)	21.6	30.1	(+8.5)	
	Dubuque			St. Louis		
<u>30 YR</u>	<u>10 YR</u>	(DEP)	<u>30 YR</u>	<u>10 YR</u>	(DEP)	
38.8	50.0	(+11.2)	17.1	27.6	(+10.5)	
	Evansville			Cairo		
<u>30 YR</u>	<u>10 YR</u>	(DEP)	<u>30 YR</u>	<u>10 YR</u>	(DEP)	
12.9	18.2	(+5.3)	9.8	11.1	(+1.3)	

TABLE 8. 30 Yr (1941-1970) Mean Snowfall and 10 Yr (1971-1980) Mean Monthly Totals (INCH)

	Chicago (MDW)			Peoria		
	1941-70	1971-80	(DEP)	1941-70	1971-80	(DEP)
Nov	3.2	3.9	(+0.7)	5.3	3.9	(-1.4)
Dec	9.7	13.7	(+4.0)	5.3	7.5	(+2.2)
Jan	9.4	15.7	(+6.3)	5.8	9.2	(+3.4)
Feb	8.1	11.0	(+2.9)	4.9	5.3	(+0.4)
Mar	7.7	7.2	(-0.5)	4.8	4.1	(+0.7)
	Rockford			Dubuque		
	1941-70	1971-80	(DEP)	1941-70	1971-80	(DEP)
Nov	3.1	4.1	(+1.0)	2.5	6.0	(+3.5)
Dec	7.6	10.7	(+3.1)	9.5	9.5	(0.0)
Jan	9.1	8.9	(-0.2)	9.6	10.0	(+0.4)
Feb	6.3	9.0	(+3.3)	6.2	10.9	(+4.7)
Mar	7.3	6.3	(-1.0)	9.7	8.6	(-1.1)
	Moline			Urbana		
	1941-70	1971-80	(DEP)	1941-70	1971-80	(DEP)
Nov	2.2	5.9	(+3.7)	2.3	4.1	(+1.8)
Dec	6.8	7.7	(+0.9)	4.8	5.6	(+0.8)
Jan	7.8	10.2	(+2.4)	4.7	10.2	(+5.5)
Feb	5.7	7.8	(+2.1)	5.8	5.8	(0.0)
Mar	6.7	7.2	(+0.5)	4.9	4.0	(-0.9)
	Evansville			Springfield		
	1941-70	1971-80	(DEP)	1941-70	1971-80	(DEP)
Nov	0.7	1.0	(+0.3)	1.5	3.4	(+1.9)
Dec	2.3	2.5	(+0.2)	4.9	5.3	(+0.4)
Jan	3.6	7.2	(+3.6)	4.6	8.4	(+3.8)
Feb	3.4	3.4	(0.0)	5.7	6.9	(+1.2)
Mar	2.9	3.2	(+0.3)	4.5	4.8	(+0.3)
	Cairo			St. Louis		
	1941-70	1971-80	(DEP)	1941-70	1971-80	(DEP)
Nov	0.4	0.2	(-0.2)	1.1	2.3	(-1.2)
Dec	1.7	0.7	(-1.0)	2.9	5.2	(+2.3)
Jan	3.0	5.5	(+2.5)	4.0	8.9	(+4.9)
Feb	2.3	2.4	(+0.1)	4.0	5.6	(+1.6)
Mar	2.4	2.2	(-0.2)	4.9	4.5	(-0.4)

TABLE 9. Growing Season
(No. of days between last spring occurrence
of 32°F and first fall occurrence of 32°F)

		30 YR AVERAGE (1931-1960)	10 YR AVERAGE (1971-1980)	(DEP)
		1931-1960	1971-1980	
North	Waukegan	166	169	(+ 3)
	Mount Carroll	154	142	(- 12)
	Rockford	160	160	(0)
	Chicago Midway	192	179	(- 13)
	Walnut	168	164	(- 4)
	Moline	174	167	(- 7)
Central	La Harpe	173	176	(+ 3)
	Peoria	181	173	(- 8)
	Pontiac	182	176	(- 6)
	Watscka	171	165	(- 6)
	Quincy	196	197	(+ 1)
	Springfield	186	187	(+ 1)
	Urbana	185	186	(+ 1)
	White Hall	184	186	(+ 2)
	Illisboro	184	180	(- 4)
	Windsor	176	181	(+ 5)
	Efingham	177	173	(- 4)
	Palestine	181	186	(+ 5)
	Lacon	169	169	(0)
South	Fairfield	193	182	(- 11)
	Mt. Vernon	191	184	(- 7)
	Sparta	198	190	(- 8)
	Anna	206	199	(- 7)
	Harrisburg	185	186	(+ 1)
	Cairo	230	239	(+ 9)

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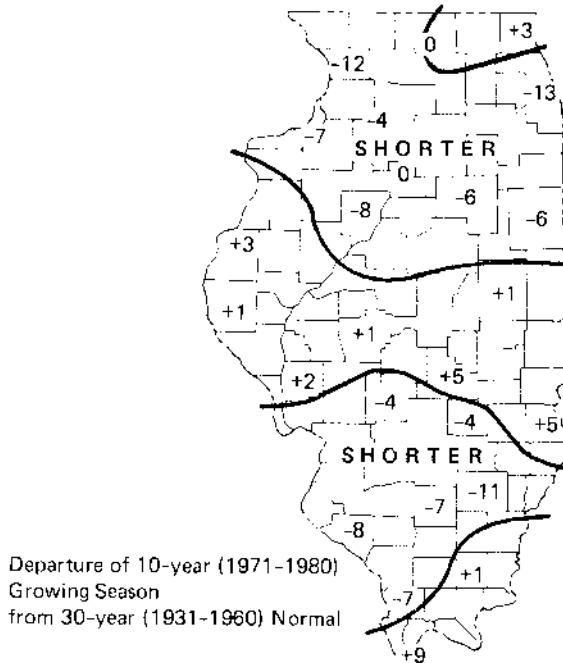
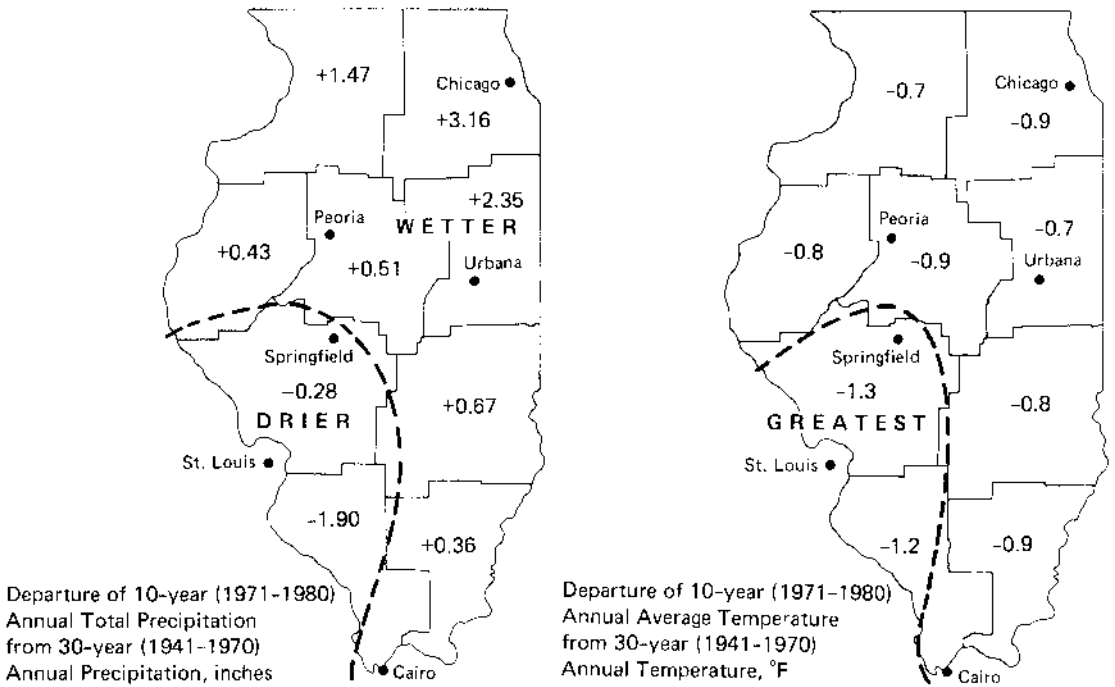


FIGURE LEGENDS

Figure 1. Departure of 10-year (1971-1980) a) annual precipitation (in) from 30-year (1941-1970) normals, b) annual temperature (°F) from 30-year (1941-1970) normals, and c) growing season from 30-year (1931-1960) normals.

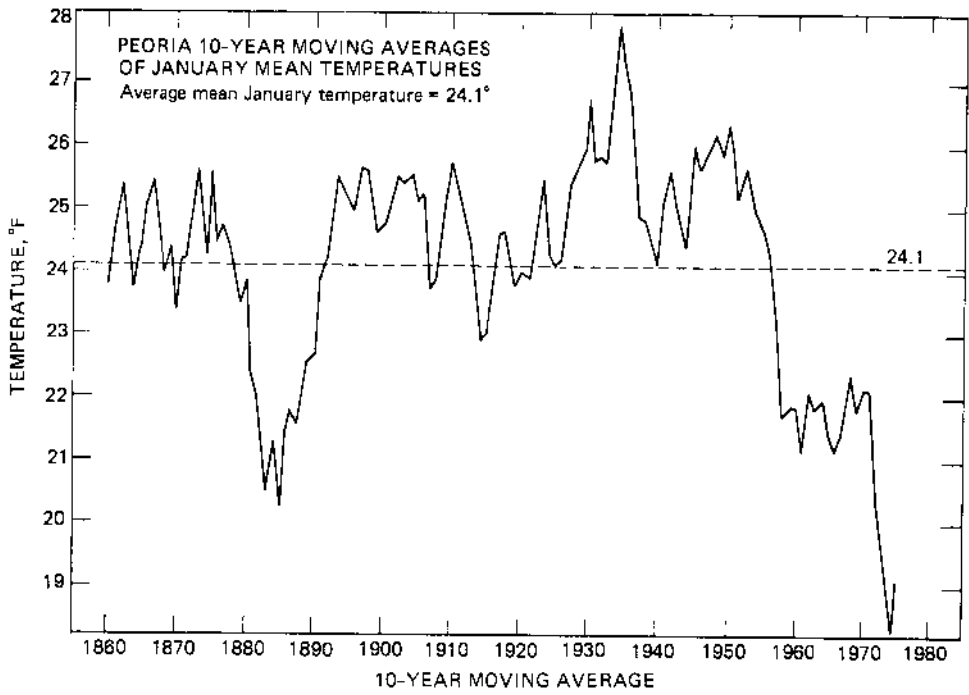


Figure 2. Peoria 10-year moving averages of January temperature (°F).

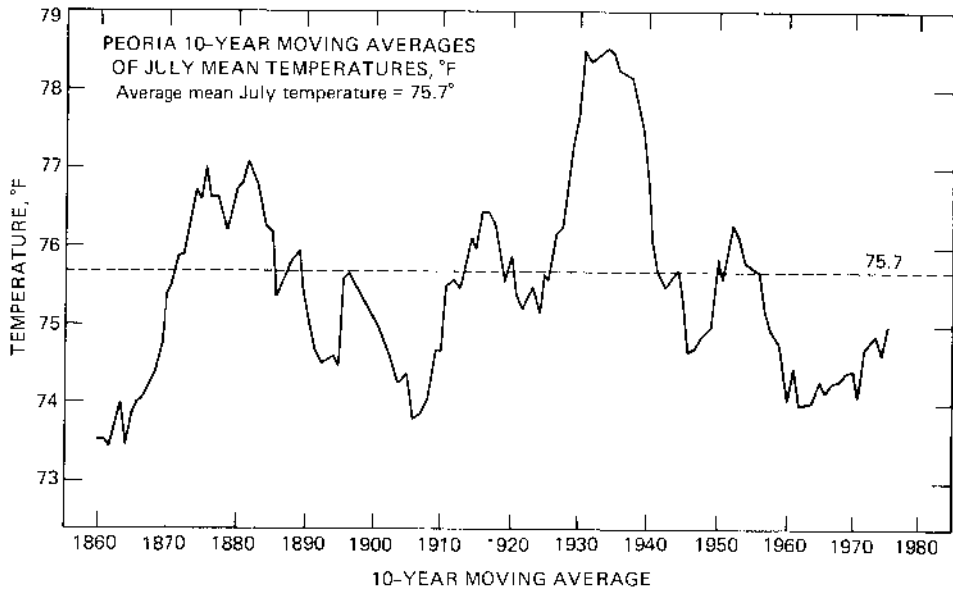


Figure 3. Peoria 10-year moving averages of July temperature (°F).

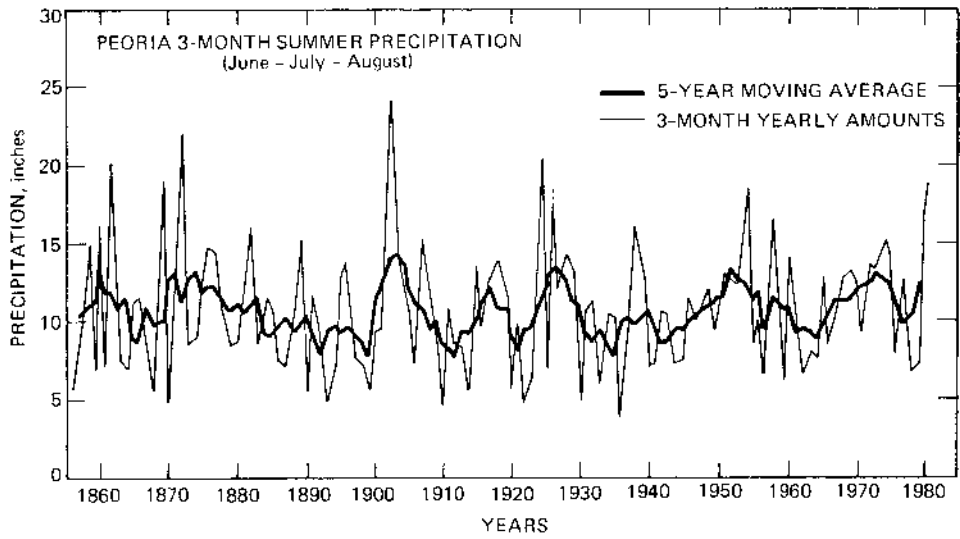


Figure 4 Peoria summer precipitation (June-July-August) 5-year moving averages and annual totals.