

# El Niño Impacts Midwest Weather in 1998

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The following is the definition of El Niño, as stated in the *Glossary of Weather and Climate* (American Meteorological Society, 1996):

*Anomalous warming of surface waters in the eastern tropical Pacific; accompanied by suppression of upwelling off the coasts of Ecuador and northern Peru and heavy rainfall in the coastal regions of those nations. Because this condition occurs around Christmas, it is named El Niño (Spanish for boy child, referring to the Christ Child). In most years, the warming lasts only a few weeks or a month, after which the sea surface temperatures and weather patterns return to normal. However, when El Niño lasts for many months, more extensive ocean warming occurs, and weather extremes occur in widely separated regions of the globe . . . .*

Much more data concerning Pacific water temperatures, ocean currents, pressure patterns and wind currents are available than ever before. Sea surface temperatures recorded in the eastern Pacific during the fall and early

were fairly consistent with those observed during the 1982-1983.

Much of the weather experienced by the United States in 1998, and in particular the winter season of 1997-1998, was as predicted by those following El Niño trends.

Portions of the United States have fairly well-defined weather patterns during strong El Niño years. For example, from California to Texas to Florida, one might anticipate precipitation totals of as much as 150 to 200 percent above normal during the winter season and into early spring (this was certainly experienced in certain southwestern and southern regions during early 1998).

The far west, northwest and northern tier of states from Washington to New York would anticipate above normal temperatures from December through February, as well as below normal precipitation (this too was experienced during the 1997-1998 winter season).

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winter of 1997 were the highest observed over the past 50 years.

Until the 1997-1998 El Niño event, the 1982-1983 event was the strongest of the century. Global weather occurrences from winter 1997-1998 into spring of 1998



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Attempts to link El Niño to Midwest winter weather have not been as successful as other regions of the United States. Strong El Niño events (where Pacific water temperatures are much above normal) seem to provide a better correlation with Midwest winter weather than do weaker El Niños.

Summer weather is much more difficult to predict based on El Niño events. Many (not including Murray and Trettel) had predicted a very hot and dry summer for the Midwest during 1998. This was not the case. Temperatures were slightly above normal in Chicago during the summer months (June through August) and precipitation was slightly below normal, however, not to the extent predicted by many.

As an example of the impacts of El Niño on the Midwest, we need to look no further than Chicago, Illinois. The following are temperature and precipitation departures from normal from December 1997 through August 1998.

**DEPARTURE FROM NORMAL**

(Temperature in degrees Fahrenheit, Precipitation in inches)

MONTH	TEMP	PRECIP
Dec '97	+4.9	-0.97
Jan '98	+8.6	+1.05
Feb '98	+13.3	+0.34
Mar '98	+1.7	+1.60
Apr '98	+1.2	-0.08
May '98	+5.9	-0.30
Jun '98	+0.7	-1.14
Jul '98	+1.3	-2.28
Aug '98	+1.8	+2.26

Temperatures experienced during January and February were extreme. Over the past 30 Februarys, February 1998 was the warmest. In the last 30 years, only two Januarys were warmer than

1998: 1989 and 1990. One must realize that the average temperature of February being more than 13 degrees above normal actually refers to the temperature being an average of more than 13 degrees above normal on a **daily** basis for the 28 days of the month.

Temperatures became much closer to normal during the spring and summer in Chicago (with the exception of May which was nearly six degrees above normal);

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however, in no month were the temperatures ever below normal.

For the first eight months of 1998, precipitation was above normal. The months of January and February 1998 and above-normal precipitation. During a winter with normal temperatures, snowfall would have been expected to be above normal during those two months. Because of the very mild temperatures, however, much of the precipitation that fell, especially during February, was in the form of rain, not snow.

A study performed by Ken Kunkel, director of the Midwestern Climate Center, found a reduction of winter snowfall in the Midwest and Great Lakes regions

during eight strong El Niño events from 1951 through 1996. The research showed a reduction of winter snowfall of 5 to 15 inches throughout much of the Midwest during strong El Niño events. Also, snowfall during the strongest El Niño winters was more than 15 inches below normal within the lake-effect snow belts of Lakes Superior, Michigan, Erie and Ontario. The below-normal snowfall in the Midwest during the 1997-1998 winter was consistent with previous strong El Niño episodes. Chicago's 1997-1998 winter snowfall was nearly 8 inches below the 30-year normal.

We are currently entering a La Niña period where Pacific water temperatures are below normal (the opposite of El Niño). The linking of anticipated weather in regions of the United States to La Niña episodes has not been very successful. Many feel the Midwest is likely to experience a "normal" winter. Because of the relatively mild winter weather experienced by the Midwest over the past years, a "normal" winter may be perceived by some as being extreme (cold with heavy snowfall)

The following are normal temperatures, precipitation and snowfall for Chicago, Illinois, for the winter months of December, January and February:

	DEC	JAN	FEB
Maximum Temp	34.0°	29.0°	33.5°
Minimum Temp	19.1°	12.9°	17.2°
Daily Mean Temp	26.6°	21.0°	25.4°
Precipitation	2.47"	1.53"	1.36"
Snowfall	8.30"	10.40"	8.20"

