

West Central Texas During El Niño: A Look at Snowfall

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1. Introduction

As has been widely advertised, a powerful El Niño has been developing across the reaches of the Pacific Ocean over the last several months. El Niño (or roughly "the Male Child" or "little one" in Spanish) got its name from Peruvian fisherman, whose catch often failed when these warmer waters moved to near the west coast of Peru around Christmas. Typically, an El Niño occurs about every 3 to 7 years, usually beginning in the summer, peaking during the winter months, and then gradually declining through the spring.

An El Niño occurs when abnormally warm ocean waters across the central and western Pacific Ocean Basin extend and cover large sections of the eastern Pacific as well. This has far reaching effects for world wide climate, altering weather patterns across the globe. Although El Niños are not directly responsible for everyday weather, it may cause particular weather patterns to occur more often over certain areas of the planet. Research has shown that the gulf coast states, including West Central Texas, are one of these areas. During an El Niño episode, storm systems generally pass over the area on a more consistent basis during the fall and winter months, increasing the amount of rain and decreasing temperatures slightly. However, does wetter and cooler also mean an increase in snowfall, or does it just mean an increase of light rain and drizzle? The purpose of this study was to establish the effects of El Niño events on snowfall across West Central Texas.

2. Methods

To establish the effects of El Niño across West Central Texas, the Local Climatological Data (LCDs) sets from both Abilene and San Angelo were studied. Abilene had the much larger data set, with near continuous records dating back to 1914. Although smaller, the complete San Angelo data still extended back to 1950, a long enough time to establish general trends. This monthly and yearly LCD data was compiled into winter seasons, extending from October through April of the following year. The seasonal data was then cross checked with a list of El Niño years to establish which winter seasons could be called "El Niño winters". In Abilene, 19 of the winters since 1914 were deemed El Niño winters, with San Angelo recording 11 since 1950.

3. Conclusions

It seems clear from the data that an increase in snowfall across West Central Texas seems to be one of the numerous results of El Niño. As seen in Table 1, the snowfall in non-El Niño winters in Abilene averaged 3.8 inches, while the seasonal snowfall average during an El Niño nearly doubled to 7.4 inches. Although not quite as pronounced, the San

Angelo data showed a similar trend, with snowfall increasing from 2.7 inches in non-El Niño periods to 4.0 inches during an El Niño (Table 2). Note, however, that the January and February snowfall records for San Angelo date back to the mid 1920's (Table 3), before complete records began, and were therefore not included in the data. These record monthly snowfalls were set during El Niño winters, and would have likely increased the El Niño winter averages even more.

The increase in snowfall is also apparent in the seasonal records in Abilene, where despite making up less than a quarter of the total number of winter seasons, El Niño winters account for 6 of the top 9 snowiest seasons on record (Table 4). One more interesting fact to note. The 1997-1998 El Niño is on pace to be one of the strongest in the last 50 years, of comparable strength with the 1982-83 and 1972-73 El Niños. The winter of 1972-73 went on record as the snowiest season on record at San Angelo and second snowiest in Abilene, with over a foot of snow having fallen in both locations (13.5 inches in San Angelo and 16.6 inches in Abilene). The winter of 1982-83 also went into the record books as Abilene's sixth snowiest.

Table 1. Abilene Snowfall Since 1914			
	# of Years	Total Snow	Average
El Niño Winters	19	140.0	7.4
Non-El Niño Winters	63	241.5	3.8

Table 2. San Angelo Snowfall Since 1950			
	# of Years	Total Snow	Average
El Niño Winters	11	44.2	4.0
Non-El Niño Winters	35	92.9	2.7

In Tables 3 and 4 (below), the records marked with an "*" occurred during periods of El Niño.

Table 3. Monthly Snowfall Records in San Angelo (inches)		
Month	Snowfall	Year
November	8.8	1968

December	3.7	1986 *
January	13.0	1926 *
February	13.0	1924 *
March	3.1	1962
April	2.0	1939

Table 4. Snowiest Seasons in Abilene Since 1914 (inches).

Rank	Snowfall	Season
1.	18.4	1918-1919 *
2.	16.6	1972-1973 *
3.	15.3	1995-1996
4.	14.0	1957-1958 *
5.	13.0	1946-1947
6.	12.2	1982-1983 *
7.	11.7	1955-1956
8.	10.6	1969-1970 *
9.	9.5	1976-1977 *
10.	9.1	1917-1918

As stated earlier, El Niño can not cause any specific weather event to occur, but only brings a better than normal chance of certain types of events. It has long been established that during El Niño events, residents of West Central Texas typically see cooler and wetter weather than normal. It seems that a better chance of snowfall may also need be added to this list.

The background data on El Niño for this paper came from several sources including:

[El Niño Frequently Asked Questions](#)--An excellent page from Bernard Meisner at NWS Southern Region HQ.