

Big-Time La Nina Tornado and Flooding Season

By Joseph D'Aleo, CCM, AMS Fellow

Tornado season kicks off in February most years, and yesterday's storm had tornadoes, and other severe weather and after a very snowy winter, major flooding. The tornado seasons tend to be more severe in La Ninas with larger outbreaks and stronger tornadoes.

Tornadoes tend to focus in the central and southern plains and the Gulf Coast during El Nino years, with a shift to the Midwest, the Ohio and Tennessee Valleys, and the mid-Atlantic region during La Nina years.

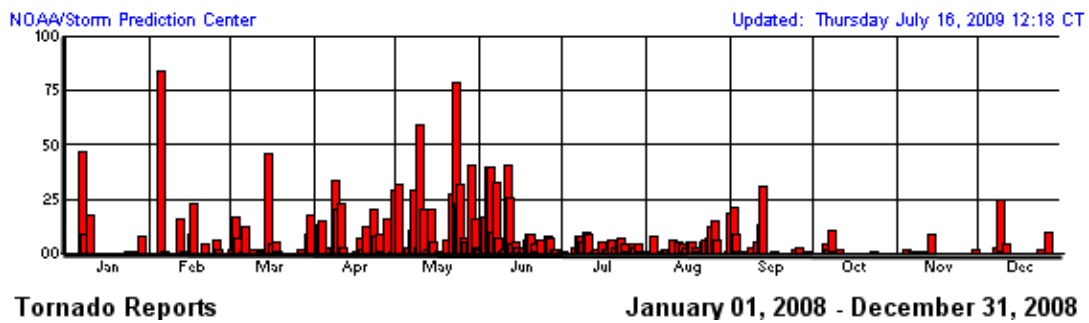
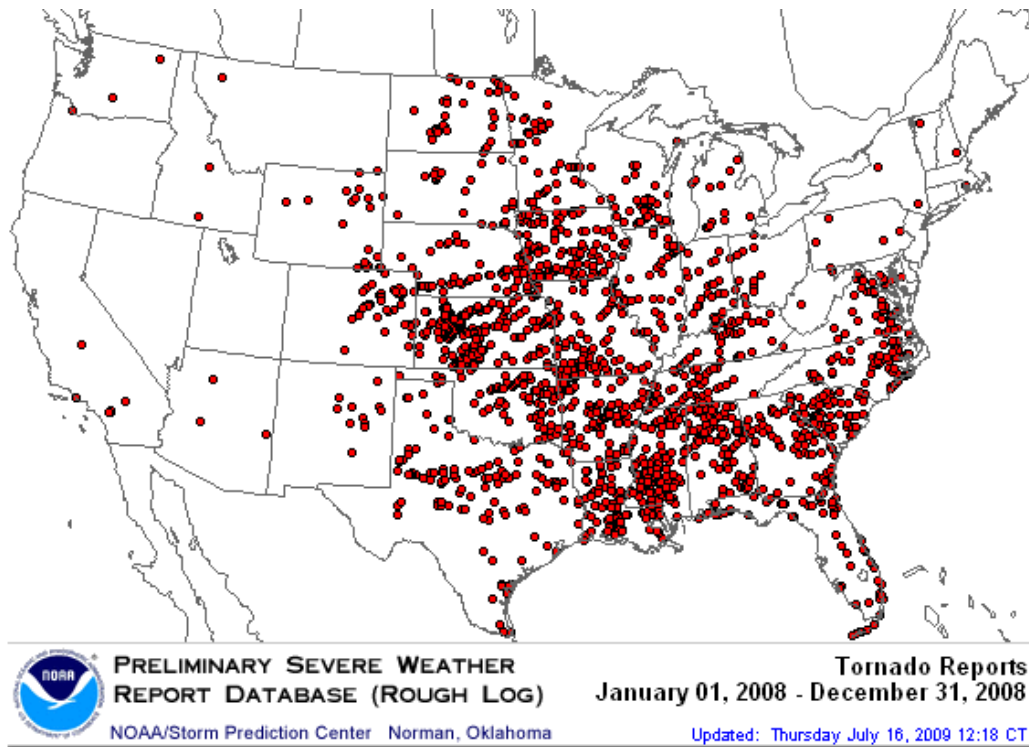


Bove (1999) showed El Ninos tend to produce more tornadoes in the southern plains, while La Nina seasons are more active in the Ohio Valley and the south.

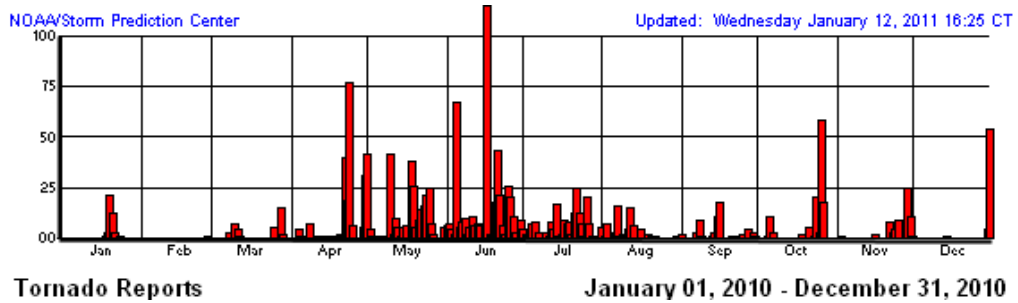
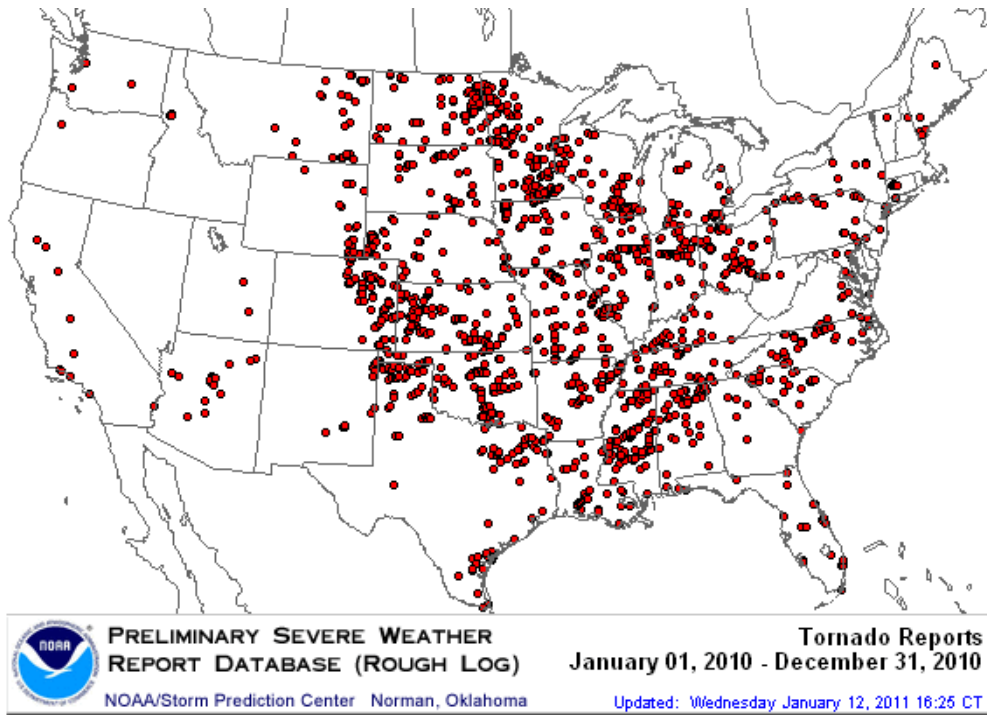
The strengths of these cycles also seem to be a factor in this data as well. Tornadoes during a La Nina are stronger and remain on the ground longer than those observed during an El Nino. That means an increased danger of large destructive and deadly tornadoes during the cold phase. There is also an increased risk of “tornado swarms” or outbreaks of 40 or more twisters from a single weather system in a La Nina season.

We believe a recent climate shift favoring a cooler Pacific and more frequent La Nina events suggests we have entered a period of increasing severe storms that could last a decade or more.

We saw a burst of activity in the La Nina year of 2008 with 1692 tornadoes.



In 2010, an El Nino year, by comparison, 1277 tornadoes occurred.



SUPEROUTBREAKS

Bove found also most large outbreaks and major tornadoes occur in cold (La Nina) or neutral (La Nada) years. He refers to the analyses by Grazulis in 1991.

15 Largest Tornado Outbreaks, 1880-1990 relation to ENSO Events

Date	Total Tornadoes	ENSO Phase
1. Apr 3-4, 1974	148	Cold
2. Sep 19-23, 1967	111	Neutral
3. Mar 20-12, 1976	66	Cold
4. Jun 2-3, 1990	64	Neutral
5. Apr 2, 1982	61	Neutral
6. Mar 13, 1990	59	Neutral
7. May 8, 1988	57	Warm
8. May 25-26, 1965	51	Cold
9. May 4-5, 1959	49	Neutral
10. Apr 11-12, 1965	48	Cold
11. Jan 9-10, 1975	47	Cold
12. May 15-16, 1968	46	Cold
13. Apr 21, 1967	45	Neutral
14. Jun 7-8, 1984	45	Neutral
15. May 29, 1980	44	Neutral

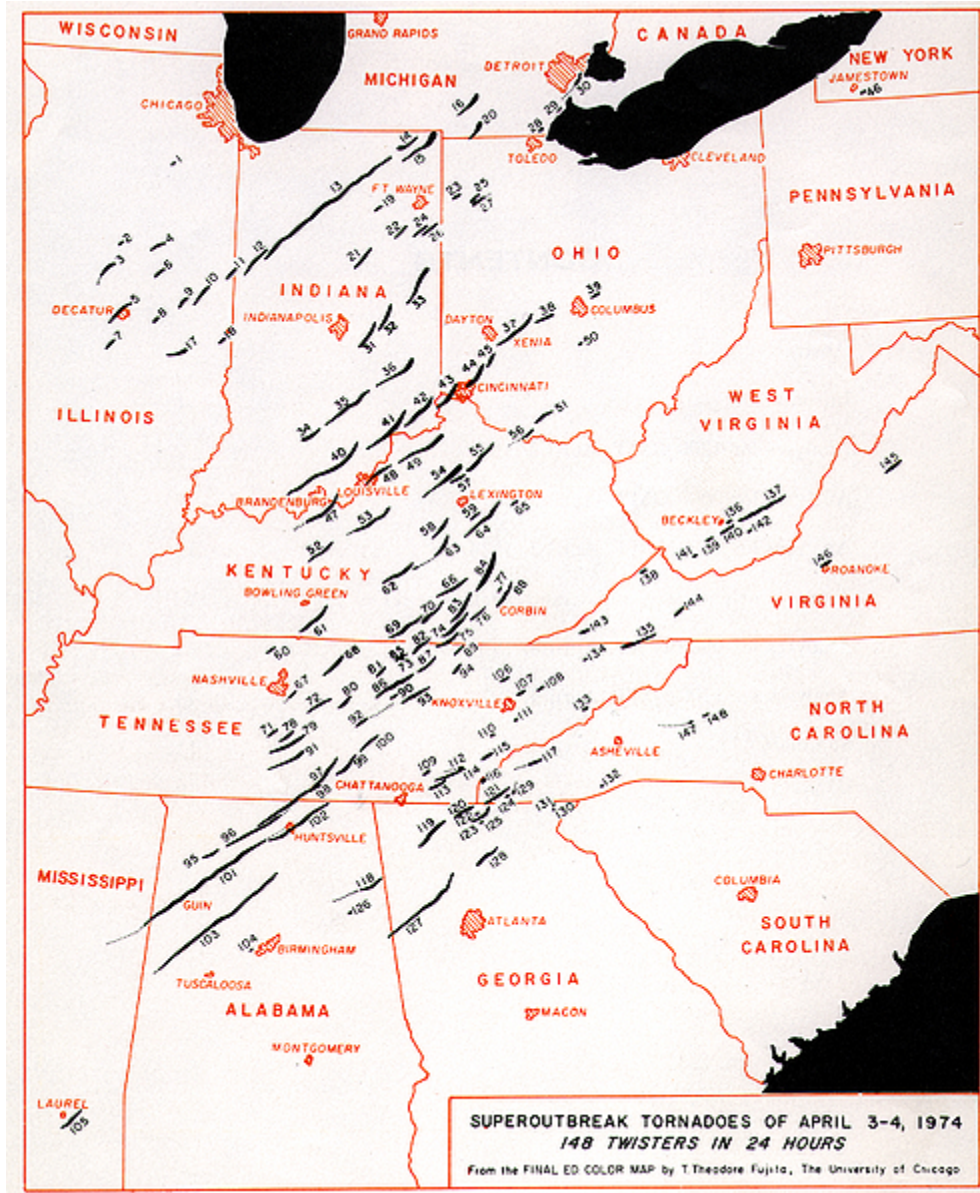
Source: Grazulis 1991

Occurrences of F4 and F5 Tornadoes With Respect to ENSO Event, 1950-1988

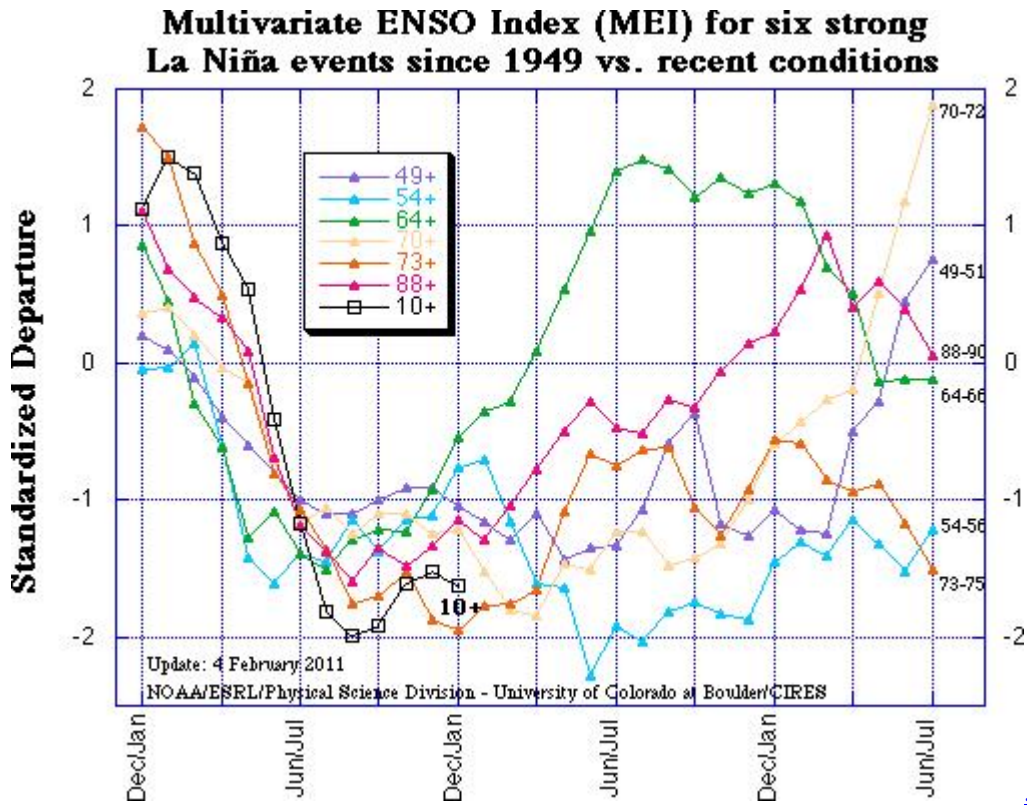
ENSO Event	# of Events	Total F4-F5 Tornadoes	Amount per Year
Cold	10	162	16.2
Neutral	19	146	8.42
Warm	10	82	8.2

Data Source: Grazulis 1991

The [Super Outbreak](#) of April 3–4, 1974 spawned 148 confirmed tornadoes across eastern North America and resulted in the second highest death toll (319) in the United States. Not only did it produce an exceptional number of tornadoes, but it was also an inordinately intense outbreak producing dozens of large, long-track tornadoes, including 7 F5 and 23 F4 tornadoes. More significant tornadoes occurred within 24 hours than any other week in the tornado record.



Note 1974 a major La Nina like this year saw major flooding in Australia's Queensland and in Brazil just like this year. Note how this La Nina using Wolter's Multivariate ENSO Index (MEI) is among the strongest ever.



Flooding

The heavy to near record snowfall season across the north has left a deep snowcover that with more spring snows and then rain could lead to flooding as we saw in recent La Nina springs of 2008 and 2009. See where there is as much as 6 -10 inches of water in the snowpack as of March 1, 2011.

Snow Water Equivalent

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