

La Niña may shift tornado activity

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Indiana, Arkansas, Mississippi and the western parts of Kentucky and Tennessee may be in store for a heightened tornado season due to the effects of La Niña, according to a study conducted at Purdue University.

Graduate student Suzanne Zurn-Birkhimer compared the geographical variation in tornadoes for El Niño years vs. La Niña years during an 81-year period. According to the study those states may experience twice as many tornadoes as last year.

"Though the study provides little reason to expect more or fewer tornadoes overall, the findings show clear evidence of geographical shifts in tornado activity within the United States when comparing strong El Niño years to La Niña years," said Ernest Agee, professor of atmospheric sciences at Purdue who oversaw Zurn-Birkhimer's research.

Zurn-Birkhimer compared tornado activity during El Niño and La Niña events by calculating a ratio of tornadoes on a state-by-state basis. Her findings show more tornadoes in the central and southern plains and the Gulf Coast during strong El Niño years, with a shift to more tornadoes in the lower Midwest, the Ohio and Tennessee valleys, and the mid-Atlantic region during La Niña years.

"That means that this year's La Niña event is likely to increase tornado activity in Mississippi, Arkansas, western Tennessee, western Kentucky and Indiana," said Agee. "In fact, these areas might expect twice as many tornadoes as last year, when they were at a lower risk of tornado activity due to the strong El Niño."

La Niña, which means "the little girl," is characterized by unusually cold ocean temperatures in the eastern tropical Pacific, as compared to El Niño, which is characterized by unusually warm temperatures in the same waters.

The changes in ocean temperature also cause a shift in the jet streams, said Zurn-Birkhimer. In her study, she calculated the positions and strengths of the polar and subtropical jet streams during El Niño and La Niña events from 1916 to 1996 to study the effect on the distribution and strength of tornadoes in the tornado alley region of the United States.

"During an El Niño event, the polar jet stream -- which carries cold, dry air from the north -- shifts south, bringing cooler air to the Midwest and Southeast," she said. "This cooling effect might also serve to suppress tornado activity in those areas."

By contrast, during a La Niña event, the subtropical jet -- the jet stream that brings warm moist air from the south -- shifts to the far north, bringing an influx of warmth and moisture to these regions, and increasing the odds for tornadoes.

"There has to be a threshold of heat and moisture to build severe thunderstorms," said Zurn-Birkhimer. "If the atmosphere's too dry or too cold, you just can't get large dynamical cloud systems like the super-cell storms. When the jet stream is farther north, as it is in a La Niña event, you have a better chance of achieving these kinds of temperatures and dew points."

Despite the popularity of blaming El Niño for all of last year's weather woes, Zurn-Birkhimer said her study shows there is little evidence that El Niños are associated with more or less national tornado activity.

"La Niña events, however, seem to favor an above-average annual number of tornadoes in select geographical regions," she says.

The 1999 tornado season already is off to a record-breaking start, said Agee, with two major tornado outbreaks in January. "Preliminary reports from the National Weather Service show that there were 169 tornadoes in January, and 19 tornado-related deaths," he said.



Courtesy NOAA

Purdue University findings show clear evidence of geographical shifts in tornado activity within the United States when comparing strong El Niño years to La Niña years," said Ernest Agee.

Related sites:

- * ENN Special Report: El Niño <http://www.enn.com/specialreports/elniño/>
- * FEMA: Tornado Safety Tips <http://www.fema.gov/library/tornadof.htm>
- * Twisters: Destruction From The Sky <http://tqjunior.advanced.org/4232/>