

Center of U.S. tornado activity shifting east and south, possibly due to climate change

August 17 2016, by Ernest Agee

A Purdue University research team has found that the center of tornado activity in the United States has shifted in recent decades, and this shift is possibly influenced by climate change.

"This completely redefines annual [tornado activity](#) in the United States," said Ernest Agee, a professor in the Department of Earth, Atmospheric, and Planetary Sciences.

Findings detailed in a paper that appeared Aug. 4 in the Journal of Applied Meteorology and Climatology, published by the American Meteorological Society, show evidence that the central area of annual tornado activity has moved from Oklahoma to Alabama.

Agee's team studied data from the past 60 years to look for a shift in annual tornado activity. The team divided the 60 years into two groups: 1954-1983, which was a time of cooler temperatures compared to an increasingly warmer second period, from 1983-2013.

Data showed a notable decrease in both annual counts and tornado days in the traditional "tornado alley" of the central plains, aided by declines in summer and autumn. However, annual values were sustained in the southeast with some increase in "Dixie alley" due in part to substantial autumn seasons increases from Mississippi to Indiana, Agee said.

One (250km x 250km) region in Oklahoma, for example, had the greatest annual number of tornado days in the first period. However, in

the latter period, a similar Oklahoma region recorded the largest decrease in tornado days, while central Tennessee had the greatest increase.

These data support the research being performed as a part of the National Oceanic and Atmospheric Administration's VORTEX-SE project, said Michael Baldwin, an associate professor in Purdue's Department of Earth, Atmospheric, and Planetary Sciences. Baldwin leads a team that was selected as one of nine to be a part of the Verification of the Origins of Rotation in Tornadoes Experiment Southeast, or VORTEX-SE. The research will continue into 2017.

"As compared to the Great Plains, the southeastern United States experiences more unexpected tornadoes from small storms, tornadoes at night and tornadoes outside of the traditional spring tornado season," he said.

While more research is needed, climate change may be influencing these results.

"The geographical shift in tornado activity has been established through powerful statistical methods and is shown to occur during two successive 30-year periods moving from a colder weather pattern to warmer conditions," Agee said. "More research is needed to search for changing climate trends responsible for tornado formation and this geographical shift, but [climate change](#) is a distinct possibility."

More information: Ernest Agee et al. Spatial Redistribution of U.S. Tornado Activity between 1954 and 2013, *Journal of Applied Meteorology and Climatology* (2016). [DOI: 10.1175/JAMC-D-15-0342.1](https://doi.org/10.1175/JAMC-D-15-0342.1)

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