

Research examines importance of 'drought-busting' tropical cyclones

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Tropical cyclones that make landfall in the southeastern United States typically make news with the damage they cause. But a study by an Indiana University Bloomington researcher and several colleagues shows that the weather events also play an important role in ending drought.

Justin Maxwell, an assistant professor of geography in the College of Arts and Sciences, is the lead author of a paper that examines the drought-busting capability of [tropical cyclones](#), a category that includes hurricanes, tropical storms and tropical depressions.

"Tropical cyclones do cause a lot of damage, but they're also very important, for people and for [ecological processes](#)," Maxwell said. "In the Southeast, they serve as a safety net. Their occurrence helps explain why the region doesn't have 10-year droughts the way they do in the West."

The paper, "Tropical cyclones and drought amelioration in the Gulf and Southeastern Coastal United States," is being published by the *Journal of Climate*, a publication of the American Meteorological Association, and is available online. Results have also been featured in the journal *Nature*.

The research finds the number of tropical cyclones that end drought is increasing, a trend that would be expected because of the warming climate. Also, cyclones often bring drought to a close well inland, not only in the coastal areas where they're expected to have an impact.

Maxwell and co-authors at the University of West Florida, the University of North Carolina-Greensboro and Appalachian State University analyzed [weather records](#) for the Southeast going back to 1895, charting what they called TCDBs—tropical cyclone drought busters. They found that tropical cyclones ended about 13 percent of droughts on the Gulf and south Atlantic coasts. Findings also include:

- The Atlantic Coast experienced drought-ending cyclones more frequently and farther inland than the Gulf Coast.
- The frequency of drought-ending cyclones increased significantly for the Atlantic Coast.
- On the Gulf Coast, the frequency of drought-ending cyclones did not rise significantly, but the area in which drought conditions were alleviated did increase.
- While it may seem intuitive that cyclones will end drought, the research breaks new ground by detailing the frequency and geographical distribution of drought-ending cyclones over time. The researchers also studied the relationship of drought-ending cyclones to large-scale cycles of ocean temperature and sea-level atmospheric pressure that play a role in the formation and movement of tropical cyclones.

With population growth booming in much of the Southeast, Maxwell said, detailed information about cyclones and drought can prove valuable for guiding development, managing water supplies and preparing for disasters.

"It matters a lot for municipalities in the Southeast," he said.

Maxwell said it was striking that, when a tropical cyclone ends a drought, the drought doesn't come back. Not once did drought conditions return the same year after being ended by a tropical cyclone. Only very rarely

did a drought resume the following year.

Provided by Indiana University

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