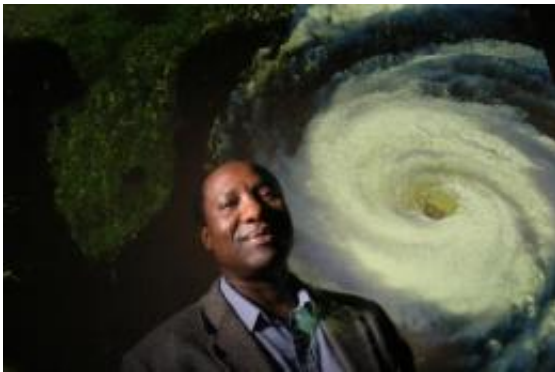


Researchers devise more accurate method for predicting hurricane activity

September 11 2012



Researchers from North Carolina State University, including Dr. Fredrick Semazzi (pictured), have developed a new method for forecasting seasonal hurricane activity that is 15 percent more accurate than previous techniques. Credit: Roger W. Winstead, North Carolina State University

Researchers from North Carolina State University have developed a new method for forecasting seasonal hurricane activity that is 15 percent more accurate than previous techniques.

"This approach should give policymakers more reliable information than current state-of-the-art methods," says Dr. Nagiza Samatova, an associate professor of [computer science](#) at NC State and co-author of a paper describing the work. "This will hopefully give them more confidence in planning for the [hurricane season](#)."

Conventional models used to predict seasonal [hurricane activity](#) rely on classical statistical methods using historical data. Hurricane predictions are challenging, in part, because there are an enormous number of variables in play – such as temperature and humidity – which need to be entered for different places and different times. This means there are hundreds of thousands of factors to be considered.

The trick is in determining which variables at which times in which places are most significant. This challenge is exacerbated by the fact that we only have approximately 60 years of historical data to plug into the models.

But now researchers have developed a "network motif-based model" that evaluates historical data for all of the variables in all of the places at all of the times in order to identify those combinations of factors that are most predictive of seasonal hurricane activity. For example, some combinations of factors may correlate only to low activity, while other may correlate only to high activity.

The groups of important factors identified by the network motif-based model are then plugged into a program to create an ensemble of statistical models that present the hurricane activity for the forthcoming season on a [probability](#) scale. For example, it might say there is an 80 percent probability of high activity, a 15 percent probability of normal activity and a 5 percent probability of low activity.

Definitions of these activity levels vary from region to region. In the North Atlantic, which covers the east coast of the United States, high activity is defined as eight or more hurricanes during hurricane season, while normal activity is defined as five to seven hurricanes, and low activity is four or fewer.

Using cross validation – plugging in partial historical data and comparing

the new method's results to subsequent historical events – the researchers found the new method has an 80 percent accuracy rate of predicting the level of hurricane activity. This compares to a 65 percent accuracy rate for traditional predictive methods.

In addition, using the network model, researchers have not only confirmed previously identified predictive groups of factors, but identified a number of new predictive groups.

The researchers plan to use the newly identified groups of relevant factors to advance our understanding of the mechanisms that influence hurricane variability and behavior. This could ultimately improve our ability to predict the track of hurricanes, their severity and how global climate change may affect hurricane activity well into the future.

More information: The paper, "Discovery of extreme events-related communities in contrasting groups of physical system networks," was published online Sept. 4 in the journal *Data Mining and Knowledge Discovery*.

Provided by North Carolina State University

Citation: Researchers devise more accurate method for predicting hurricane activity (2012, September 11) retrieved 12 May 2024 from <https://phys.org/news/2012-09-accurate-method-hurricane.html>

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