

Iowa State researchers contribute climate model to study that finds some winds decreasing

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Iowa State University researchers contributed their regional climate modeling expertise to a study that found surface wind speeds are decreasing across the country. That could have implications for the wind power industry, agriculture and city air pollution. Credit: Photo by Iowa Energy Center.

Declining wind speeds in parts of the United States could impact more than the wind power industry, say Iowa State University climate researchers.

Three Iowa State researchers contributed their expertise in modeling

North America's climate to a study to be published in the *Journal of Geophysical Research - Atmospheres*. The study - led by Sara C. Pryor, a professor of [atmospheric science](#) at Indiana University Bloomington - found that wind speeds across the country have decreased by an average of .5 percent to 1 percent per year since 1973.

"The study found that across the country wind speeds were decreasing - more in the East than in the West, and more in the Northeast and the Great Lakes," said Gene Takle, an Iowa State professor of geological and atmospheric sciences and agronomy.

In Iowa, a state that ranks second in the country for installed wind power capacity, Takle said the study found annual [wind speed](#) declines that matched the average for the rest of the country.

The study's findings made headlines across the country. Most of those stories focused on the potential implications for the wind power industry.

But Iowa State's team of climate researchers - Takle; Ray Arritt, a professor of agronomy; and Bill Gutowski, a professor of geological and atmospheric sciences - say the study raised other issues and questions, too.

The study looked at eight sets of wind data going back to 1973 and up to 2005: actual wind speed measurements from anemometers; a hybrid of measurements and computerized climate models; and two different regional climate models. Iowa State researchers contributed a regional model of North America's climate they've worked with since the early 1990s. It's a community model that researchers across the globe share and use. The Iowa State researchers have used the model to run long-term climate simulations.

Takle said there wasn't a lot of agreement between the measurements and the various models. The model that most closely matched the measurements was the one used by the Iowa State researchers.

Gutowski said the differences aren't surprising because the study was an initial examination of surface wind trends. He also said those differences tell climate researchers they have more work to do.

"We see this trend toward slower wind speeds and our unanswered question is whether this is part of global warming or something else," Gutowski said. "What we're poking into here is not something that's commonly explored. Most studies look at temperature and precipitation, not surface winds."

But the researchers said slower surface winds can have significant impacts beyond the wind power industry.

Crops, for example, depend on the wind for ventilation and cooling. Slower winds could mean higher field temperatures and less productive crops.

Slower winds could also mean more dew covering crops for longer periods, Takle said. That could mean problems with fungus and plant disease. That could also lead to lower yields at harvest time.

In cities, slower winds can mean more pollution and heat, the Iowa State researchers said.

"Air pollution episodes in major cities happen when there's high pressure and stagnant air,"

Takle said. "Less wind means less ventilation and less sweeping away of pollutants."

Slower winds can also be a problem when heat waves hit a city, he said. The winds wouldn't dissipate as much heat, allowing heat to linger and build.

All of those potential impacts need further study, the researchers said. And so does the cause of the apparent decline in the country's [wind](#) speeds.

Takle suggested three possibilities for the trend: changes in instrumentation produced flawed measurements (though Takle said researchers made corrections to account for the changes); the study didn't account for land-use changes such as development and tree planting that slowed winds near instruments; or the climate is changing and one consequence is slower winds.

Arritt said the study appears to support theories that climate change could affect surface winds.

"There are some good theoretical reasons to think that global warming will cause lighter winds in regions between the tropics and the Arctic," Arritt said. "But we like to confirm our theory with data, and our results make us think the theory is on track."

Source: Iowa State University ([news](#) : [web](#))

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