

Hawaii will get twice as many cyclones by century's end -- study

Stephanie Paige Ogburn, E&E reporter

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It isn't often that a tropical cyclone hits Hawaii. On average, the powerful storms cross paths with the island once every four years, and the last really destructive one, Hurricane Iniki, hit in 1992.

By 2075, though, as ocean temperatures rise and atmospheric circulation changes due to climate change, tropical cyclones are twice as likely to hit the island state -- and they'll be stronger to boot.

Those are the findings of a study published online yesterday in the journal *Nature Climate Change*, which looked at changes to tropical cyclones near Hawaii in the years 2075 to 2099.

Hiroiyuki Murakami, the study's lead author and a postdoctoral fellow at the International Pacific Research Center at the University of Hawaii, Manoa, said that although a number of models have suggested that tropical cyclones may decrease worldwide, what will happen at a regional scale is less certain.

But based on the analysis he and his co-authors did, he is fairly certain that, at least toward the end of the century, Hawaii will get more cyclones.

"I have a lot of confidence in these future projections," he said.

That's because Murakami's team ran its model many times, each time under a slightly different scenario. And despite those differences, the results were the same: more cyclones heading toward Hawaii.

The storms will be stronger, as well, because the ocean temperatures will go up. Warmer seas mean that they can pick up more energy from the ocean and become more intense.

Models give consistent result

These findings were not unexpected, but this is the first time a team has actually done the work to project what is likely to happen to cyclones in this part of the Pacific, said

Gabriel Vecchi, a scientist at the National Oceanic and Atmospheric Administration's Geophysical Fluid Dynamics Laboratory who also studies the impacts of climate change on tropical storms.

"They did a really good job," Vecchi said. "It was thorough, and they pointed out an interesting feature that hadn't really received as much attention as it could have."

The work will likely prompt others to pay more attention to this region to predict climate change's impact on storms, because this paper highlights a region where models are giving a consistent result, Vecchi added.

This is in contrast to other parts of the world, like the North Atlantic Ocean, where models tend to come up with a wide range of predictions for what will happen to cyclones in the future. There, it is hard to tell how climate change will alter those storms or whether there will be more or fewer of them.

That's another active area of research for scientists like Murakami and Vecchi, who are trying to learn more about those processes in the North Atlantic.

Murakami said the reason his first analysis looked far out in time is that the effects of climate change are easier to see when there has already been a significant amount of warming. In the future scenario he used, the average global temperature has increased by a bit more than 2 degrees Celsius from today's averages.

"In the near future, global warming is very small. So we cannot distinguish between a global warming effect or natural variability," he said. "So to see more clearly the effect of global warming on tropical cyclones, we forced a larger warming, like at the end of the century."

But now that he has done the work of looking 75 years out, he is trying to do the harder work of determining the nearer-term impacts of warming on tropical cyclones.

"This is a very important issue for society," he said.--

Stephanie Paige Ogburn

Reporter, [ClimateWire](#)