

Hurricanes to grow more destructive as oceans warm, study warns

By Timothy Hurley
thurley@staradvertiser.com

This year's ferocious Atlantic hurricane season will be the rule — not the exception — if climate change-driven ocean warming continues unabated.

And that also goes for the Pacific Ocean and the waters surrounding Hawaii, says Tim Li, atmospheric sciences professor at the University of Hawaii.

Li is a lead author of a new study that suggests we face a world of larger and more destructive hurricanes as our oceans rise in temperature under the influence of global warming.

Li, who works at UH's International Pacific Research Center, collaborated with colleagues in China affiliated with the Nanjing University of Information Science and Technology and the National University of Defense Technology in Nanjing.

The study, published in the journal *Scientific Reports*, examined the question: What is the impact of ocean warming on the size and destructiveness of tropical cyclones?

The study's conclusion: As sea surface temperatures get hotter, tropical cyclones will not only become more intense — unleashing stronger winds — but will blast gale-force gusts over a much wider area.

Results from the team's modeling found that tropical storms will be 30 percent larger as the ocean warm

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by only 1 degree Celsius, or 1.8 degrees Fahrenheit. Under at least one scenario, that could happen as soon as 20 to 30 years from now.

Using both long-term and short-term climate simulations, the researchers found that for every degree Celsius increase of sea surface temperature, the destructive potential of tropical storms increases by 340 percent in the western North Pacific and 150 percent in the North Atlantic.

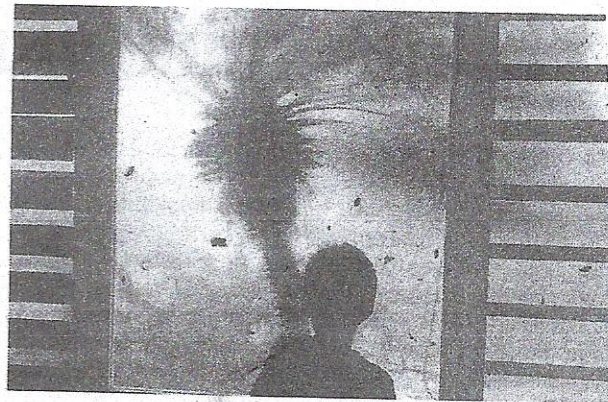
While the study focused on only two ocean regions, Li said he would expect to see similar results for the Central Pacific.

Li said this year's Atlantic hurricane season, with its monster storms that terrorized Houston, Florida and Puerto Rico, is a taste of what can be expected if global warming continues.

First, Harvey slammed Texas with more than 50 inches of rain. Then Irma devastated the Florida Keys and the west coast of Florida. Finally, Maria left a path of destruction in the Caribbean after blowing up from a tropical storm to a Category 5 hurricane in just two days.

While a number of previous studies found that tropical cyclone intensity, or wind speed, increases with warmer oceans, Li said the research ignored storm size.

What determines the size of a hurricane?



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Hurricane Maria, which devastated Puerto Rico last month, is one of several monster storms to hit the Atlantic this year. A boy looked out as strong winds sent debris flying in Juncos, Puerto Rico, last month.

"We're not really sure," the researcher said. "On the other hand, storms in the western North Pacific are generally larger in size, and the sea surface temperatures are generally warmer."

Sea surface temperatures are known to have risen by about 2 degrees Fahrenheit in the last century. What's more, the temperature of the ocean's surface has been consistently higher during the past three decades than at any other time since reliable observations began in 1880, according to U.S. Environmental Protection Agency data.

How can we avoid a new norm of massive storms with their heightened threat to people and natural ecosystems?

Reduce greenhouse gases, Li said flatly, to help stem the momentum of climate change.

The effort may have

greater implications for Hawaii. In 2010, Li led a team of researchers in a global warming study that predicted a shift in the location of tropical cyclones from the Western Pacific to the Central Pacific.

The study indicated that tropical cyclone genesis would double in the Central Pacific in 30 to 40 years amid weakening tradewinds and wind shear caused by climate change. The conditions would "pose a great threat to millions of people living in Hawaii and Central Pacific islands."

As for his latest work, Li noted that the results might be model-dependent, so further modeling is necessary to confirm the results.

Li said the research group plans to take into account other natural forces and projected sea surface temperature patterns around the world in future research.