

# Tropical cyclones to cause greater damage

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Tropical cyclones will cause \$109 billion in damages by 2100, according to Yale and MIT researchers in a paper published in *Nature Climate Change*.

That figure represents an increased [vulnerability](#) from [population](#) and especially [economic growth](#), as well as the [effects of climate change](#). Greater vulnerability to cyclones is expected to increase global tropical damage to \$56 billion by 2100—double the current damage—from the current rate of \$26 billion per year if the present climate remains stable.

[Climate change](#) is predicted to add another \$53 billion of damages. The damage caused by climate change is equal to 0.01 percent of GDP in 2100.

The United States and China will be hardest hit, incurring \$25 billion and \$15 billion of the additional damages from climate change, respectively, amounting to 75 percent of the global damages caused by climate change. Small islands, especially in the Caribbean, will also be hit hard, suffering the highest damages per unit of GDP.

The research reveals that more intense storms will become more frequent with climate change. "The biggest storms cause most of the damage," said Robert Mendelsohn, the lead economist on the project. "With the present climate, almost 93 percent of tropical cyclone damage is caused by only 10 percent of the storms. Warming will increase the frequency of these high-intensity storms at least in the North Pacific and North Atlantic Ocean basins, causing most of the increase in damage."

The authors based their estimates on a future global population of 9 billion and an annual increase of approximately 3 percent in gross world product until 2100. "More people making a lot more income will put more capital in harm's way," he said.

[Tropical cyclones](#) today cause \$26 billion in global damages, which is 4 percent of gross world product. North America and East Asia account for 88 percent of these damages, because these regions have powerful storms and well-developed coastlines.

The future economic damage from tropical cyclones will be less than \$1 billion a year in Europe and South America because there are few storms there, and the damage in Africa will be low because, Mendelsohn said, there is "relatively little in harm's way." Damages in Asia and Central America are expected to grow rapidly in concert with high economic growth. The Caribbean-Central America region will have the highest damage per unit of gross domestic product—37 percent.

"When you calculate [damages](#) as a fraction of GDP, island nations are hit disproportionately hard," he said.

**More information:** The paper, "The Impact of Climate Change on Global Tropical Cyclone Damage," is available at [www.nature.com](http://www.nature.com)

Provided by Yale University

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