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Climate Change Could Make Hurricanes Stronger—and More Frequent

Existing research suggests that hurricanes could become stronger but less frequent thanks to climate change. But a new study says both could happen.

By [Bryan Walsh @bryanrwalsh](#) | July 09, 2013 | [153 Comments](#)

Maybe Mayor Michael Bloomberg would have gone through the trouble of putting together a [430-page report outlining a \\$19.5 billion plan](#) to save New York from the threat of [climate change](#) had [Hurricane Sandy](#) not hit last year and inflicted some \$20 billion in New York City alone. But somehow I doubt it. There's a reason that a satellite image of Hurricane Katrina highlighted the poster for *An Inconvenient Truth*, or that belief in man-made [global warming](#) tends to spike after extreme weather. Heat waves are uncomfortable and drought is frightening, but it's superstorms—combined with the more gradual effects of sea-level rise—that can make climate change seem apocalyptic. Just read Jeff Goodell's [recent piece in Rolling Stone](#) about what a major hurricane might be able to do to Miami after a few decades of warming.

But there was one hopeful side effect to climate change, at least when it came to tropical storms. The prevailing scientific opinion—seen in this [2012 report](#) from the Intergovernmental Panel on Climate Change—is that while tropical storms are likely to become more powerful and rainier as the climate warms, they would also become less common. Bigger bullets, slower gun.

(MORE: [The Most Destructive U.S. Hurricanes of All Time](#))

A [new study](#) in the *Proceedings of the National Academy of Sciences*, however, suggest that we may not be so lucky. Kerry Emanuel, an atmospheric scientist at the Massachusetts Institute of Technology (MIT) and one of the foremost experts on hurricanes and climate change, argues that tropical cyclones are likely to become both stronger *and* more frequent as the climate continues to warm—especially in the western North Pacific, home to some of the most heavily populated cities on the planet. But the North Atlantic—meaning the U.S. East Coast and Gulf Coast—won't be spared either. Bigger bullets, faster gun.

(MORE: [Tornadoes Were Just the Beginning. This Hurricane Season Is Going to be Stormy](#))

Emanuel is going up against the conventional wisdom and much of the published literature with this paper. But the reality is that we don't have a very good grasp of how tropical cyclone formation or strength might change in the future. As Adam Freedman [points out at Climate Central](#), hurricanes may be huge, but they're still too small to be easily tracked by computer climate models, which do better on a larger scale. Emanuel embedded higher-resolution regional and local models into an overarching global framework. Emanuel's



PHOTO BY NASA VIA GETTY IMAGES

A satellite image shows Hurricane Sandy as it approached the East Coast on Oct. 28, 2012

“downscaled” model simulates the development of tropical cyclones at a resolution that will increase as the storm gets stronger. For each of the six IPCC global climate models, Emanuel simulated 600 storms every year between 1950 and 2005, then ran the model forward to 2100, using an IPCC forecast that has global carbon dioxide emissions tripling by the end of the century.

Emanuel’s simulations found that the frequency of tropical cyclones will increase by 10 to 40% by 2100. And the intensity of those storms will increase by 45% by the end of the century, with storms that actually make landfall—the ones that tend to smash—will increase by 55%. As Emanuel [told LiveScience](#):

We see an increase, in particular, toward the middle of the century. The results surprised us, but we haven’t gotten so far as to understand why this is happening.

(MORE: [Why Dwindling Snow — Thanks Largely to Climate Change — Might Dry Out Los Angeles](#))

OK, big caveats here. Emanuel is a very well-respected climatologist, but it always takes more than a single study to overturn existing scientific opinion—especially if that opinion is itself a little wobbly. Georgia Tech climatologist Judith Curry, who falls on the [more skeptical side](#) of the scientific debate on climate change, [told this to Doyle Rice of USA Today](#):

The conclusions from this study rely on a large number of assumptions, many of which only have limited support from theory and observations and hence are associated with substantial uncertainties. Personally, I take studies that project future tropical cyclone activity from climate models with a grain of salt.

We’ll see in the decades to come whether Emanuel is right. But in a way, it may not matter all that much. As Sandy showed, hurricanes already pose a tremendous threat to our coastal cities. And that threat will continue to grow no matter what climate change does to tropical storm frequency or intensity because we’re putting more and more people and property along the water’s edge. Remember Miami? In 1926 the city [was devastated](#) by a Category 4 hurricane. (Sandy barely ranked as a Category 1 by the time it made landfall.) The difference is that there wasn’t much of a Miami back in 1926—the city’s population had [just passed 100,000](#). Today more than [2.5 million people](#) call Miami-Dade county home, and a hurricane of the same sort that hit in 1926 that hit now would cause [\\$180 billion in damages](#). Whatever climate change does to hurricanes, we need to be ready.

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