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Global warming to cause 50% increase in lightning strikes across the U.S.: Study



A lightning bolt strikes down during a storm with the One World Trade Center tower, left, as a backdrop, Wednesday, July 23, 2014, in Jersey City, N.J.

IMAGE: JULIO CORTEZ/ASSOCIATED PRESS

BY ANDREW FREEDMAN
2 HOURS AGO

The future just got a whole lot flashier — and more dangerous, too.

A new study [published Thursday in *Science Magazine*](#) shows that the frequency of lightning flashes across the U.S. could increase by 50% during the course of this century, due to manmade global warming. This means that for every two lightning strikes that occurred in the year 2000, there will be about three strikes in 2100, according to lead author David Romps, an earth sciences professor at the University of California, Berkeley.

SEE ALSO: [U.S.-China climate deal is big for politics — but not enough for climate](#)

Such an increase in lightning — the U.S. is already hit by about 20 million strikes per year, each of which is mapped by a National Lightning Detection Network — could have major implications for the number of wildfires in the country, since at least half of such fires are caused by lightning. What's more, lightning is one of the deadliest weather phenomena in the U.S., killing at least 50 people each year, on average. With more strikes — possibly as many as 30 million annually — the risk of fatalities will also increase.

“As far as impacts go, one of the things that comes to mind first is wildfire,” Romps told *Mashable*. Large wildfires are already [becoming more common](#) across the West, as the region warms and precipitation becomes more variable, with bigger projected increases in large fires, known as “megafires,” in coming decades.



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Oftentimes, lightning-triggered wildfires are more difficult for firefighters to fight because they can be instigated far from human settlements and road networks.

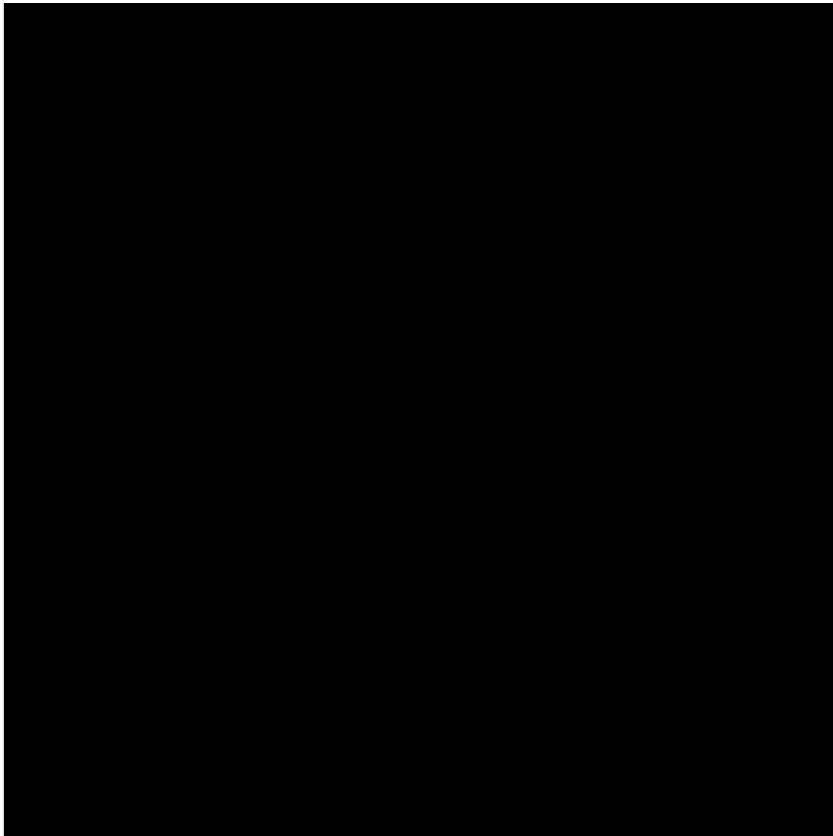
For their study, Romps and his colleagues had to develop proxy indicators of lightning activity, since climate models don't directly simulate small-scale weather, such as lightning, from individual thunderstorms. "They can't do that because lightning is created on scales that are much too small to be resolved by climate models," Romps said.

To get around this limitation, they studied two variables that together turned out to explain close to 80% of observed lightning in the current climate, as measured using 2011 lightning data, according to Romps. These variables are the precipitation rate, which measures how much water is being processed by thunderstorms, and a measure of atmospheric instability, known as convective available potential energy or CAPE. Lightning requires a cloud to have water in all three states — liquid, solid (ice) and gas — at the same time, and to be lifting ice high into the atmosphere.



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So, a proxy indicator created by multiplying the projected precipitation rate combined with CAPE, which captures how readily and rapidly the air will likely rise within a storm, given a trigger such as a cold front, should predict lightning rates, the scientists concluded.

A warmer, wetter atmosphere is projected to increase both of these ingredients that help trigger thunderstorms, particularly CAPE values, Romps said. This is the main reason why lightning is expected to become more frequent. "When a storm goes, it can take advantage of that greater amount of fuel," he said.

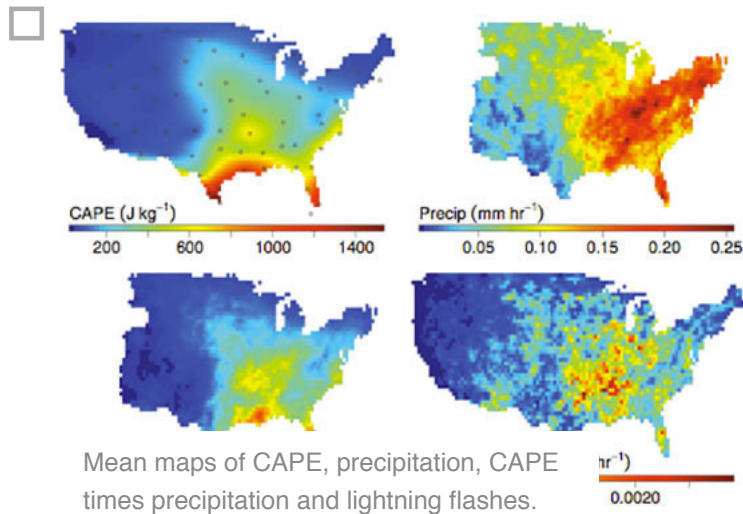


IMAGE: SCIENCE/ROMPS ET AL. 2014

The study applied the proxy value to 11 of the latest climate models, averaging the results across the continental U.S. They found that lightning strikes may increase by 7% to 17% per degree Celsius of global warming, and by about 50% over this century.

Although the study only focused on the U.S., presumably a warmer, wetter world would also alter lightning rates in other areas. Right now, lightning strikes the ground somewhere on Earth about 100 times each second, for a total of about 8 million — yes, million — times per day, according to the [National Severe Storms Laboratory](#). Most lightning strikes occur near the tropics, from the Amazon to Africa and the dwindling rainforests of Southeast Asia.

Other recent studies have also shown significant increases in CAPE values by the end of the century across much of the U.S., which implies that there will be more thunderstorm days, particularly in the Southeast and East Coast. However, few studies have been published that look at lightning in a warming world.

“This is an example of a change that we can expect with global warming that will be quite noticeable,” Romps said.

BONUS: 6 Common Myths About Climate Change

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