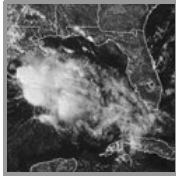


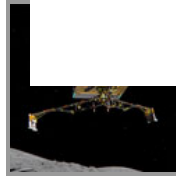
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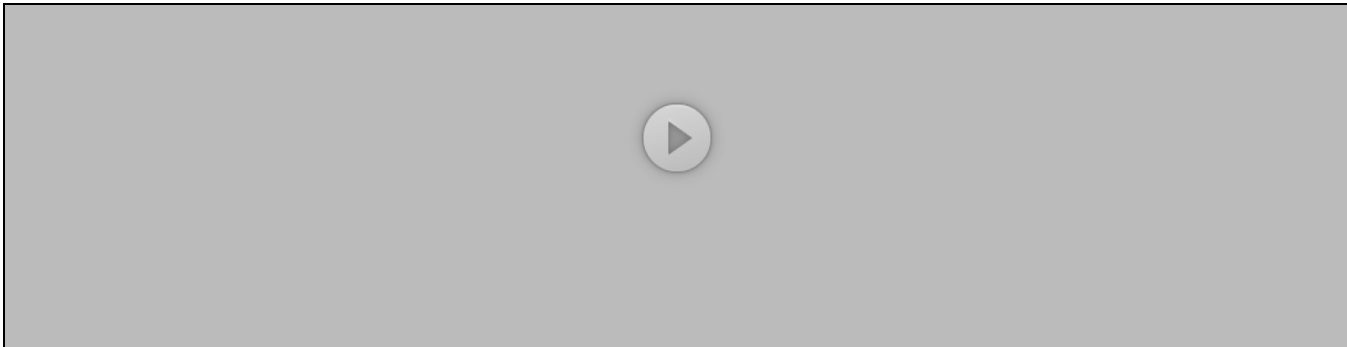
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How Global Warming Could Create More Lightning And Wildfires

A study in Science suggests that lightning frequency could increase by 12 percent for every degree Celsius the Earth warms.

By Rebecca Boyle



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In the future, summers are going to be a lot more electrifying.

While climate change will alter weather patterns different way in different places around the world, climate modelers generally agree that storms will become more severe as the world gets warmer. [According to new research](#), that includes a lot more lightning—up to 50 percent more across the continental United States if the globe warms as much as many scientists think it will by 2100.

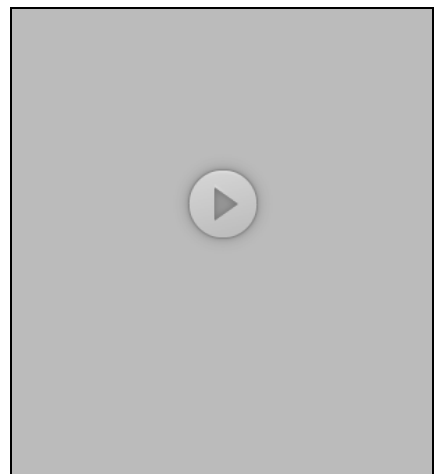
Lightning strikes will increase about 12 percent for every 1 degree Celsius rise in global average air temperatures, the new study in Science says. And because lightning is the primary cause of wildfires, so this is a huge threat to the already-dry American West.

Scientists led by David Romps at the University of California, Berkeley built a new equation that predicts lightning frequency with admirable accuracy. When they tested it against 2011 records from the National Lightning Detection Network, the model correctly predicted 77 percent of ground strikes, Romps says.

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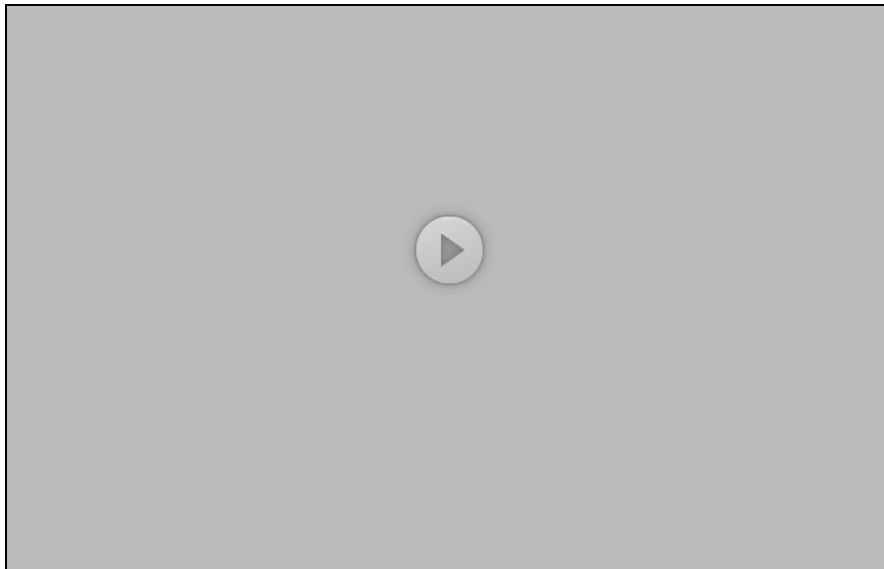
"That's remarkable. When I saw that, I thought it must be a mistake, because it seems too good to be true," he says. "We see the [model] predicting lightning accurately on daily timescales, seasonal timescales, and timescales in between, among storms moving across the US."

When they plugged the same equation into 11 different global climate models, the scientists found that average lightning increase of 12 percent per degree C—higher than previous estimates. Scientists have been trying to predict frequency of lightning events in a warmer future world by using current observations, but past is

not always prologue, and previous models have yielded mixed results. This new work, at least, relies on the physics of storms to make predictions.

"To make lightning, you need two ingredients: Water in all three phases coexisting—so liquid, vapor, and ice—and clouds rising quickly enough to loft that ice and keep it suspended," Romps says. "The hypothesis we had is that lightning would be proportional to the product of precipitation, which is how much water is processed, times this measure of storm vigor."

The storm vigor he's referring to is the energy available to make atmospheric air rise, called the convective available potential energy (CAPE). To get this data, the scientists had to pull information from weather balloons, which gauge temperature and humidity levels across the continental U.S. Then they could calculate how much kinetic energy clouds can get as they rise through the atmosphere—their CAPE. Water and heat are the fuel for thunderstorms. Clouds have to release latent heat from water vapor in order to become buoyant enough to rise, Romps says.



Previous climate simulations have shown that global warming causes CAPE to increase across most of Earth, and across the continental U.S. in particular. That's connected to some of the physics of water — warmer air can hold more water vapor than cooler air, Romps notes.

"As we warm the planet, we on average have more water vapor lying around," he says.

Global climate models estimate the world will be about 4 degrees Celsius (7 degrees Fahrenheit) warmer, on average, by the end of the century. Extending the model through 2083, Romps and colleagues find about a 48 percent increase in lightning strikes in that time.

This could potentially mean more people will get hit by lightning, but that's still an extraordinarily rare event. The U.S. sees about 25 million lightning bolts a year, and about 33 deaths on average since 2006, [according to the National Oceanic and Atmospheric Administration](#). Far more likely is an increase in wildfires triggered by extra lightning — compounded by warmer average temperatures and drought in the American West, Australia, and other fire-prone areas.

"It could be that areas that get a lot will get even more, or it could be that regions that don't get very many strikes today end up with more than they're used to. We just don't know," Romps says. "But figuring out that distribution in space and time is important for predicting future wildfire intensity."

TAGS: [weather](#), [effects of global warming](#), [global warming](#), [lightning](#)

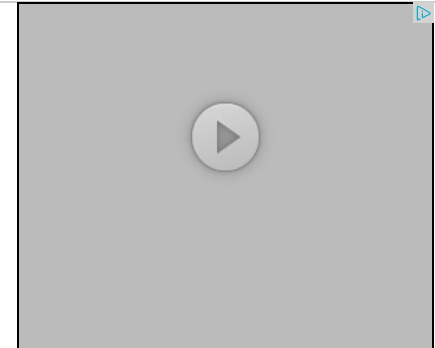
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