

SCIENCE

Lightning Might Strike More in a Warmer World

By JUSTIN GILLIS NOV. 13, 2014

To the ever-growing list of projected effects from global warming, add a curious entry: a potentially huge jump in lightning strikes in the United States.

Researchers reported Thursday that they had discovered a simple physical relationship that seems to predict lightning strikes, and used it to produce a better estimate of the likely change if warming continues unchecked through this century. The forecast: an increase on the order of 50 percent.

That would likely alter the chemistry of the atmosphere in complex ways, not all of them necessarily bad. It might also increase the risk of wildfires, especially in remote areas where most fires tend to be ignited by lightning. And it could kill more people directly, although lightning causes well under a hundred deaths a year in this country.

David M. Romps, an atmospheric physicist at the University of California, Berkeley, who led the work, said the change would come about from a global temperature increase of roughly 7 degrees Fahrenheit. “This increase in lightning is an example of a fairly large change that you can get from what sounds like a relatively small global temperature increase,” Dr. Romps said.

The finding is not entirely a surprise. By definition, global warming puts more energy into the atmosphere, and increased lightning had long been predicted as one consequence. But methods of estimation were crude.

In the sort of head-slapping moment that is rare in modern science, Dr.

Romps and his graduate student, Jacob T. Seeley, found that lightning strikes could largely be forecast by a simple equation that incorporates data for precipitation and storm energy. It seems to work over large areas; previous researchers may have missed it by looking at too small an area, Dr. Romps said. The finding propelled their paper into the journal *Science*, which released it Thursday afternoon.

With their equation, Dr. Romps, Mr. Seeley and two colleagues were able to look at computerized forecasts of the future climate and deduce the implications for lightning strikes. While a 50 percent increase is the most likely figure for the United States under unchecked global warming, the full range of possibilities runs from a 14 percent increase to a 90 percent increase.

Lightning provides the energy to form new chemical compounds in the air, including some pollutants. The exact effects on atmospheric chemistry would depend on many factors, but one possibility would be to increase a chemical that helps to break down methane, a powerful greenhouse gas that contributes to global warming.

Kevin E. Trenberth, a climate scientist at the National Center for Atmospheric Research who was not involved in the new paper, said he found it generally plausible, but noted that the researchers were able to get the data necessary to test their equation for only a single year, 2011. The method needs to be tested in other years, he said.

Dr. Romps said his group was now working to get more data, as well as to extend the work to make lightning predictions at both the local and global scales.

If efforts to control emissions fail so completely that global temperatures are actually allowed to warm by 7 degrees Fahrenheit, future generations are likely to have much bigger problems to worry about than lightning.

Recent reports have warned that an increase that high would likely be devastating to the food supply, and would lead to the long-term melting of the ice sheets in Greenland and West Antarctica, causing a rise of the sea

that would probably exceed 30 feet over centuries and could flood the world's major coastal cities.

© 2014 The New York Times Company