What we can say about the Louisiana floods and climate change

By Chris Mooney, Washington Post on 08.19.16
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Danny and Alys Messenger canoe away from their flooded home after reviewing the damage in Prairieville, La., Aug. 16, 2016. As waters begin to recede in parts of Louisiana, some residents struggled to return to flood-damaged homes on foot, in cars and by boat. AP/Max Becherer

Here we are again, with a flood event upending lives for large numbers of Americans and making everybody wonder about the role of climate change.

In this case, it's the stunning, multiday flooding in southern Louisiana that hit after a low-pressure system combined with record amounts of atmospheric water vapor, dumping more than 2 feet of rainfall over three days in some places. Six people were killed, and thousands have had to leave their homes.

By Monday, climate researchers and weather experts were in what's by now familiar posture -- explaining that, no, this event wasn't "caused" by climate change, but then again, it's precisely the sort of event that you'd expect to see more of on a warming planet.

"Climate change has already been shown to increase the amounts of rain falling in the most intense events across many parts of the world, and extreme rainfall events like this week's Louisiana storm are expected (to) grow increasingly common in the coming years," wrote the Weather Underground's Bob Henson and Jeff Masters.

"Louisiana is always at risk of floods, naturally, but climate change is exacerbating that risk, weighting the dice against us," Katharine Hayhoe, a climate researcher at Texas Tech University, told The Washington Post. "How long will it be until we finally recognize that the dice are loaded?"

The easiest link between climate change and extreme weather events involves heat waves, a recent study by the National Academy of Sciences found. This makes sense: A warming planet overall breaks warm temperature records more frequently than cold temperature records, and sets the stage for lengthier, or stronger, bouts of extreme heat.

But one of the other relatively simple links involves rainfall and heavy flooding. "Heavy rainfall is influenced by a moister atmosphere, which is a relatively direct consequence of human-induced warming, though not as direct as the increase in temperature itself," the National Academies report noted.

This is because as the atmosphere warms, its ability to retain water vapor increases. Thus, the climate influence on precipitation events runs from tropical cyclones to blizzards, and all of them should be able to produce more precipitation in extreme events than before.

Indeed, when it comes to heavy precipitation events, a trend has already been documented in the United States and in the region currently experiencing disaster, notes the National Climate Assessment:

What this means is that the kind of event we're seeing right now is the kind of event we expect to see more of in the future. It does not, however, mean that this event was "caused" by climate change.

To be sure, researchers could try to prove a link between this event and climate change. To do so, they could perform what is called an "attribution study," which determines whether an event like this one is more likely to occur in a world full of human greenhouse gas emissions than in one without it. So far, no such study appears to have been attempted -- but it could be soon. These types of studies are growing increasingly common.

That still wouldn't be a causal determination. Rather, it would likely result in a statement about a shifting of the odds in favor of an event like this one.

But not all researchers are convinced that this is the only way to tackle this problem.

Climate scientist Kevin Trenberth of the National Center for Atmospheric Research has argued that we should turn the tables and, rather than assuming that a climate link to a given extreme event remains to be proved, simply assume one exists for extreme events driven by thermodynamic factors -- e.g., heat and moisture -- like heat waves and major rain events.

"Because global warming is real and present, it is not a question as to whether it is playing a role but what that role is," wrote Trenberth and two colleagues in a 2015 paper.

In the meantime, though, most scientists continue to talk about an increase in a particular type of event and shifting odds, which are no less consequential for our society.

"We design our infrastructure and plan our society looking backward, assuming that the past is a reliable predictor for the future. And looking backward does keep us safe, when climate is relatively stable, as it has been over much of the history of human civilization on this planet," said Hayhoe.

"When climate is changing, though, relying on the past to predict the future will give us the wrong answer -- and not just a wrong answer, but a potentially dangerous one," she said. "We buy a house outside the 100-year flood zone, believing that means we're safe; we expect our storm sewer drains and our levees to protect us from all but the rarest extremes, failing to account for how these extremes are rapidly becoming more frequent in a changing climate."

Quiz

1 Which of the following are the STRONGEST pieces of evidence connecting climate change to flooding?

1. *In this case, it's the stunning, multiday flooding in southern Louisiana that hit after a low-pressure system combined with record amounts of atmospheric water vapor, dumping more than 2 feet of rainfall over three days in some places.*
2. *By Monday, climate researchers and weather experts were in what's by now familiar posture -- explaining that, no, this event wasn't "caused" by climate change, but then again, it's precisely the sort of event that you'd expect to see more of on a warming planet.*
3. *"Climate change has already been shown to increase the amounts of rain falling in the most intense events across many parts of the world, and extreme rainfall events like this week's Louisiana storm are expected (to) grow increasingly common in the coming years," wrote the Weather Underground's Bob Henson and Jeff Masters.*
4. *But one of the other relatively simple links involves rainfall and heavy flooding. "Heavy rainfall is influenced by a moister atmosphere, which is a relatively direct consequence of human-induced warming, though not as direct as the increase in temperature itself," the National Academies report noted.*

(A) 1 and 2

(B) 2 and 3

(C) 3 and 4

(D) 4 and 1

2 Read the following selection from the article:

> *To be sure, researchers could try to prove a link between this event and climate change. To do so, they could perform what is called an "attribution study," which determines whether an event like this one is more likely to occur in a world full of human greenhouse gas emissions than in one without it. So far, no such study appears to have been attempted -- but it could be soon. These types of studies are growing increasingly common.*
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> *That still wouldn't be a causal determination. Rather, it would likely result in a statement about a shifting of the odds in favor of an event like this one.*

What can be inferred from the selection above?

(A) Greenhouse gases have not caused climate change, but there is a connection between them and extreme weather.

(B) Most people do not believe that climate change is real, no matter how many studies are done that prove it exists.

(C) Researchers are about to definitively prove the link between climate change and extreme weather events like floods and blizzards.

(D) Though many people believe it is true that climate change causes extreme weather, proving the connection is difficult.

3 According to the article, each of the following are results of climate change EXCEPT:

(A) warmer air

(B) greenhouse gases

(C) heavier snowstorms

(D) increased rainfall

4 Which sentence BEST summarizes how climate change has impacted our ability to plan for the long-term future?

(A) It has given us a better idea of what the weather will be like in 100 years.

(B) It has forced us to plan our society by looking backward to the past.

(C) It has made it more difficult to make predictions in a world where extremes will be common.

(D) It has provided the opportunity to make better plans because the weather has been studied.

Answer Key

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