

American Geophysical Union  
2017 Fall Meeting Day 3: 13 December 2017  
AGU Release No. 17-95  
For Immediate Release

## **AGU Fall Meeting: Human-caused warming likely intensified Hurricane Harvey's rains**

### **AGU Contacts:**

Nanci Bompey                      Lauren Lipuma  
+1 (914) 552-5759                +1 (504) 427-6069  
[nbompey@agu.org](mailto:nbompey@agu.org)                [llipuma@agu.org](mailto:llipuma@agu.org)

### **AGU Fall Meeting Press Room:**

Morial Convention Center, Room 350-351  
+1 (504) 670-5513  
[news@agu.org](mailto:news@agu.org)

NEW ORLEANS — New research shows human-induced climate change increased the amount and intensity of Hurricane Harvey's unprecedented rainfall. The new findings are being published in two separate studies and being presented in a press conference today at the [2017 American Geophysical Union Fall Meeting](#), along with additional new findings about recent Atlantic Ocean hurricanes.

Hurricanes Harvey, Irma and Maria battered the U.S. Gulf Coast and Caribbean earlier this year, bringing widespread flooding and wind damage. Hurricane Harvey, a Category 4 storm at first landfall on August 25, stalled over Texas as a tropical storm, causing record rainfall between August 26 and 28.

A [new study](#) accepted for publication in *Geophysical Research Letters (GRL)*, a journal of the American Geophysical Union, finds Hurricane Harvey's seven-day rainfall total potentially increased by at least 19 percent compared to a similar storm in the mid-20th century. [Another study](#) published online today in the journal *Environmental Research Letters (ERL)* directly attributes the rainfall increase to human-caused climate change. The *ERL* paper finds climate change made the record three-day rainfall that fell over Houston during Hurricane Harvey roughly three times more likely and 15 percent more intense than a similar storm in the early 1900s.

The new research confirms heavy rainfall events are increasing across the Gulf Coast region because of human interference with the climate system. Climate change, caused by increasing greenhouse gases in the atmosphere from the burning of fossil fuels, is raising temperatures globally. Warmer air can carry more moisture, which can lead to more extreme rainfall events, and warmer ocean surface temperatures are known to intensify the most powerful hurricanes.

In the *GRL* study, researchers used a statistical model based on historical climate data to separate how much of the extreme rainfall from Hurricane Harvey was due to natural influences and how much was due to human influences. They first estimated the chances of Harvey's precipitation total at the present day then estimated the amount of precipitation that would have fallen in an event of the same rarity using 1950s greenhouse gas levels, essentially stripping away the effects of today's higher greenhouse levels.

The study's authors expected about a 6 percent increase in rainfall from Hurricane Harvey because of warming in the Gulf of Mexico. The new study finds human-induced climate change likely increased Hurricane Harvey's unprecedented rainfall by at least 19 percent and potentially as much as 38 percent.

"It is not news that climate change affects extreme precipitation, but our results indicate that the amount is larger than expected," said researcher Michael Wehner of Lawrence Berkeley National Laboratory in Berkeley,

California, a co-author of the new *GRL* study, who will also be presenting the new research at a [press conference](#) at the AGU Fall Meeting today.

In the new study in *ERL*, researchers examined the observed rainfall record in the Gulf Coast region since 1880 to show that the intensity of extreme precipitation has increased substantially. Multiple high-resolution climate models confirmed that the increasing trend is due mainly to human-caused global warming.

Overall, the chances of seeing a rainfall event as intense as Harvey have roughly tripled – somewhere between 1.5 and five times more likely – since the 1900s and the intensity of such an event has increased between 8 percent and 19 percent, according to the new study by researchers with [World Weather Attribution](#), an international coalition of scientists that objectively and quantitatively assesses the possible role of climate change in individual extreme weather events.

Even if global targets set by the Paris Agreement of limiting warming to 2 degrees Celsius (3.6 degrees Fahrenheit) are met, scientists estimate an event like Hurricane Harvey will see a further increase of about a factor of three in probability.

“But, if we miss those targets, the increase in frequency and intensity could be much higher,” said Karin van der Wiel, a postdoctoral researcher at the Royal Netherlands Meteorological Institute (KNMI) in De Bilt, Netherlands and a co-author of the new *ERL* paper, who will also be presenting the new research at a [press conference](#) today at the AGU Fall Meeting.

###

#### **Notes for Journalists**

Study authors Michael Wehner and Karin van der Wiel will present this research in a [two-part press conference](#) on hurricanes Harvey, Irma and Maria on Wednesday, 13 December 2017 starting at 2:30 p.m. CST.

#### **Paper Information:**

*Geophysical Research Letters*: [Attributable human-induced changes in the likelihood and magnitude of the observed extreme precipitation in the Houston, Texas region during Hurricane Harvey](#)

*This research article is open access for 30 days.*

*Environmental Research Letters*: [Attribution of extreme rainfall from Hurricane Harvey, August 2017](#)

#### **Contact information for the authors:**

**Michael Wehner**, [mfwehner@lbl.gov](mailto:mfwehner@lbl.gov), +1 (415) 305-1044

**Mark Risser**, [mdrisser@lbl.gov](mailto:mdrisser@lbl.gov)

**Karin van der Wiel**, [karin.van.der.wiel@knmi.nl](mailto:karin.van.der.wiel@knmi.nl)

###

*The **American Geophysical Union** is dedicated to advancing the Earth and space sciences for the benefit of humanity through its scholarly publications, conferences, and outreach programs. AGU is a not-for-profit, professional, scientific organization representing more than 60,000 members in 139 countries. Join the conversation on **Facebook**, **Twitter**, **YouTube**, and our other **social media channels**.*