



Is Climate Change Responsible for Extreme Weather?

Katrina, Sandy, California drought, Colorado flooding....it would be tempting to seize upon these and other marquee weather events as concrete evidence of anthropogenic (human-caused) climate change. But what is the reality? Is the increase in intensity and occurrence of extreme weather events directly caused by global warming? Or are these events purely natural events that ebb and flow over time?

The reality actually falls somewhere in the middle. The National Oceanic and Atmospheric Administration (NOAA) published a paper in 2014 entitled "Explaining Extreme Events of 2013 from a Climate Perspective." In terms of the role that anthropogenic climate change played in these events, the results were mixed: while the findings indicated that climate change did indeed increase the risk of extreme heat waves, other weather events including the California drought, blizzards, storms, and flooding provided less conclusive evidence that climate change was a direct cause.

Climate scientists have arrived at a 97 percent consensus that CO₂ emissions from burning fossil fuels and deforestation have led to an increase of CO₂ in the atmosphere by 40 percent since the industrial revolution, in turn creating a greenhouse effect that has led to warming of the planet by 1 degree Centigrade (2 degrees Fahrenheit). This CO₂ concentration is higher than at any time during the last 650,000 years.

Anthropogenic warming causes a feedback loop between earth's atmosphere and its oceans--as ocean temperatures rise sea levels rise as well, increasing the amount of water vapor absorbed back into the atmosphere. The excess CO₂ in the atmosphere amplifies the effect of the water vapor, which in itself is a greenhouse gas, leading to a further increase in air moisture, ocean temperature, and sea levels.

However, while scientists have indeed found that extreme weather events are occurring more often than 50 or even 100 years ago, they are careful not to confuse correlation with causation. Just because two events occur simultaneously (extreme weather events and long-term climate change) does not necessarily mean that one causes the other. While global warming can intensify extreme weather events, it would be a leap to say that such an event was actually caused by climate change. The NOAA report bears this out: observed heat waves were the only weather events that could be significantly linked to global warming.

A 2014 Forbes report perpetuates a common myth using the conclusions of the NOAA report to claim there is no link between global warming and extreme weather. The myth states that all extreme weather results from purely natural causes. Furthermore, the article downplays the risk of death due to heat waves because some publications claim that people are more likely to die of extreme cold than excessive heat.

The article is deceptive in that it uses the findings of the report on specific weather events to disavow any influence global warming may have on recent extreme weather effects, claiming that these events are happening naturally. This technique exploits the fallacies of both over-simplification and jumping to conclusions.

Dismissing climate change as playing any kind of role in extreme weather events oversimplifies and even dismisses the fact that rises in temperature and sea levels due to global warming can both intensify these events and increase their frequency due to the feedback loop between our atmosphere and the ocean.

Increased air moisture and sea levels leads to more intense rainfall and snowfall events, such as the India flooding in 2013, which killed 5,800 people. A more warmed and moist atmosphere can be especially devastating when it comes to hurricanes, which originate in warm, tropical water. Even a small increase in moisture and sea levels can intensify storm surges, massive rainfalls, and strong winds--Lloyd's of London insurance company estimates that sea level rises over the past 50 years contributed to high surges during Superstorm Sandy, increasing losses by 30 percent.

This myth that the Forbes article puts forward is a bit like saying that it doesn't matter what we eat or how much we consume because we are likely to gain weight anyway as we age due to slowed metabolism. On the contrary, we are more likely to gain weight as we age, but eating too much and eating the wrong things greatly increases and accelerates our risk of weight gain.

And to state that just because more people die of extreme cold vs. excessive heat over-simplifies the impact that heat waves impose on agriculture and human health. In fact, a climate attribution study of the European heatwave in 2003 that human-caused climate change was largely responsible for the 70,000 deaths that occurred.

Unfortunately, the media often plays a part in perpetuating this myth by jumping to conclusions and claiming climate change is the actual cause of extreme weather events. This undermines the tendency of climate scientists to not assign causality between anthropogenic climate change and extreme weather events unless a link between the two is clearly demonstrated by their findings.

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