

Scientists see increasing floods with changing climate

Dan Brennan
23 May 2011

In the wake of the Mississippi River flooding, climate scientists are highlighting the link between global climate change and increasingly frequent floods and other extreme weather events. They warn of even greater risks in the future.

While impacts like temperature spikes and sea level rise may come to mind first when considering climate change, altering precipitation patterns and intensifying rainfall can have equally devastating consequences. Katharine Hayhoe, climate scientist at Texas Tech University, explained during a press conference held by advocacy group Union of Concerned Scientists, “Climate change is about more than warming. What we’re really seeing is global ‘weirding.’ For many places around the world, what we are likely to see could be feast or famine—more frequency of weather at the extremes, from intense storms to prolonged droughts.”

The “robust conclusion” of increased weather extremes was underscored in a recent National Academy of Sciences (NAS) report on the current state of climate science. The report noted the historical record of growing total worldwide precipitation as well as a rising fraction that falls in heavy downpours. As one indication, the NAS reported, “the heaviest one percent of rain events increased by about 20 percent over the past century in the United States.” The report adds, “The climate models project that these trends, which create challenges for flood control and storm and sewer management, are very likely to continue.”

Consistent with the growing fraction of rainfall coming in heavy storms, the frequency of droughts has also risen in some areas, although declining in others. In the United States, the Midwest and Great Plains have

experienced more rainfall whereas the Southeast and West have seen increased drought over the past 50 years.

The increasingly extreme weather, in particular heavy storms and flooding, is severely affecting the living standards of millions globally. In the past year alone, mega floods inundated one-fifth of the total land area in Pakistan and vast stretches in Queensland and Victoria in Australia; now the overflowing Mississippi River is returning devastating high waters to the lower Midwest and the southern states of Tennessee, Mississippi, Arkansas, and Louisiana, a cruel sequel to last year’s “1000-year” floods in Tennessee and neighboring states.

All told, these floods cost the lives of tens of thousands and brought destruction on the scale of tens of billions of dollars. Since 1970, storms and floods were responsible for more than 90 percent of the economic costs of extreme weather-related events worldwide, according to the think-tank Resources for the Future.

Insurance companies, positioning themselves for profit, have closely tracked the economic impact over the years. Nikhil da Victoria Lobo at the international reinsurance firm Swiss Re explained the rising tide of costs associated with the extreme weather during the UCS press conference. “Economic losses from natural disasters have soared from a global average of \$25 billion annually during the 1980s to \$130 billion a year during the decade ending in 2010,” he remarked.

Although it’s not possible to say exactly how much is due to climate change—a significant portion is also attributable to increasing development in flood-prone areas—there is little doubt that climate was a major factor, he explained.

Indeed, it is not possible to pinpoint a specific causal

role for climate change in any individual flood. Nonetheless, as Dr. Hayhoe explained, “We do know that every event that happens is already superimposed on very different background conditions than we had 50 years ago.” The probability of flooding increases, analogous to “loading the dice,” she said.

With increasing occurrence of flooding, scientists have turned to assessing the vulnerabilities and identifying adaptation strategies necessary to reduce the impacts of climate change. The NAS, in its most recent report, called for immediate action on adaptation planning and implementation measures at all levels of society. “In the judgment of the Committee on America’s Climate Choices,” the report states, “the environmental, economic, and humanitarian risks of climate change indicate a pressing need for substantial action to limit the magnitude of climate change and to prepare to adapt to its impacts.”

Despite the years and even decades of warnings from the scientific community—and indeed the realization of those warnings, as Mississippi flooding illustrates—the United States remains alarmingly unprepared for increased flooding and other climate impacts. This is true on a much broader level than just the large-scale disasters.

As an example, the NAS report highlights the vulnerability of mass transit in NYC to heavy precipitation events. During a heavy storm in 2007, the subsequent flooding entirely shut down the subway system, effectively paralyzing the city. Eight tons of debris had to be removed and a variety of equipment repaired before reopening the subway lines. The report noted “more frequent events like this one can be expected to increase the frequency of transit interruptions unless proactive steps are taken.”

During the UCS press conference, Aaron Durnbaugh, an official from Chicago’s Department of Environment, discussed the challenges facing that city’s 150-year-old sewage system. “We need to know what to expect and act accordingly,” he said. “Given our financial challenges, we just need to be sure that if we’re replacing a sewer or adding green infrastructure, it’s ready to handle the kind of rain events we’re likely to see.”

But the willingness to upgrade the capacity municipal sewers, transit systems or any other vital infrastructure systems during a time of austerity budgets and tax cuts

for the wealthy—even to maintain current levels of service, let alone expand the capacity to deal with a changing climate—is increasingly absent in city after city and state after state throughout the country. The dearth of funding for these projects is compounded by cuts at the federal level. One prominent example: last month’s budget compromise slashed \$1 billion in federal aid for water infrastructure.

Missy Stults from Local Governments for Sustainability summed up, “In the end, planning for climate change is just about smart planning for tomorrow.” As events are proving, an economic system where rational planning is subordinated to short-term profit interests is more and more incapable of meeting this challenge.



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