

## 2016's hellish summer weather: A told-you-so climate moment?

September 20 2016, by Seth Borenstein

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In this July 8, 2016, file photo, a Filipino girl is carried along a flooded road in suburban Mandaluyong, east of Manila, Philippines, as monsoon downpours intensify while Typhoon Nepartak exits the country. This past summer's weather was relentless and hellish, crowded with the type of record-smashing extremes that scientists have long warned about. The season ends Wednesday, Sept. 21, 2016, and not a moment too soon. Summer featured floods that killed hundreds of people and caused more than \$50 billion in losses around the globe, from Louisiana and West Virginia to China, India, Europe and the Sudan. Meanwhile, droughts parched croplands and wildfires burned from California to Canada to China and India. Toss in unrelenting record heat. (AP Photo/Aaron Favila, File)

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From June to August, there were at least 10 different weather disasters that each caused more than \$1 billion in losses, according to insurance industry tallies . With summer weather now seemingly stretching from May to September, [extreme weather](#) in that span killed well more than 2,000 people. And that's without a major hurricane hitting a big U.S. city, although the Pacific had its share of deadly and costly storms, among them Typhoon Nepartak, which killed 111 people in Asia.

"It is representing I think a notch up for the impacts we have had to deal with," U.S. National Weather Service Director Louis Uccellini said. "We've experienced an increasing number and a disturbing number of weather extremes this summer."

While flooding made the news, the "sneaky" thing about the summer was heat that did not even ease at night, said Deke Arndt, climate monitoring chief at the federal National Centers for Environmental Information in Asheville, North Carolina. When temperatures drop to below 72 (22.22 Celsius) at night it allows the body to recharge, plants to grow and air conditioners to be shut off. But this year that didn't happen enough.

The U.S. as a nation set a record for the hottest nighttime temperatures

on average this summer, Arndt said. Tallahassee, Florida, for example, went 74 consecutive days where the nighttime temperature didn't dip below 72.

From May 1 to Sept. 12, nearly 15,000 daily records for warmest nighttime lows were set in the United States, according to the National Oceanic and Atmospheric Administration data .



In this Aug. 14, 2016 file photo, a Louisiana Army National Guard dump truck that drove off the road is submerged in flood waters near Walker, La., after heavy rains inundated the region. This past summer's weather was relentless and hellish, crowded with the type of record-smashing extremes that scientists have long warned about. The season ends Wednesday, Sept. 21, 2016, and not a moment too soon. Summer featured floods that killed hundreds of people and caused more than \$50 billion in losses around the globe, from Louisiana and West Virginia to China, India, Europe and the Sudan. Meanwhile, droughts parched croplands and wildfires burned from California to Canada to China and

India. Toss in unrelenting record heat. (AP Photo/Max Becherer, File)

"This is one of the clearest signals we expect for [climate change](#)," said Mark Bove, a New Jersey-based senior research meteorologist for re-insurance giant Munich RE, which tracks natural disasters . "It keeps a blanket on you particularly at night. We cannot radiate the heat away at night as the planet used to."

While records were broken, the summer has "been more notable for the consistency of the heat than individual high-impact heatwaves," said Blair Trewin of the Australian Bureau of Meteorology and the World Meteorological Organization.

For example, Savannah, Georgia, had a record 69 days in a row of 90 degrees (32.22 Celsius) or higher.

Twelve U.S. cities had their warmest summers ever, including Las Vegas, New Orleans, Cleveland and Detroit. The globe had its hottest month on record (July) and hottest summer on record. August was the 16th consecutive month Earth set a monthly heat record, according to NOAA.

Temperatures of 129 degrees (54 degrees Celsius) were recorded in Mitribah, Kuwait, and Basra, Iraq. If verified, these would be not only the hottest temperatures recorded for Asia, but the hottest recorded outside a much-debated record in Death Valley, according to weather historians.

The extra heat—both in the air and oceans—puts significantly extra moisture in the air, which then comes down as more extreme downpours, said Kevin Trenberth, a senior scientist at the National Center for

Atmospheric Research. And when an area is already dry, droughts worsen because warmer air takes more water out of the ground, like "levying a larger tax on the plants and soil moisture," Arndt said.

Baton Rouge and South Bend had their wettest summers, while Boston and Jacksonville had their driest summers.



In this Aug. 17, 2016 file photo, firefighters battle a wildfire as it crosses Cajon Boulevard in Keenbrook, Calif. This past summer's weather was relentless and hellish, crowded with the type of record-smashing extremes that scientists have long warned about. The season ends Wednesday, Sept. 21, 2016, and not a moment too soon. Summer featured floods that killed hundreds of people and caused more than \$50 billion in losses around the globe, from Louisiana and West Virginia to China, India, Europe and the Sudan. Meanwhile, droughts parched croplands and wildfires burned from California to Canada to China and India. Toss in unrelenting record heat. (AP Photo/Noah Berger, File)



Climate scientists say what's happened pretty much fits with what they've been saying would occur as the world warms. For most of the extreme events, they haven't done the precise and detailed studies that can show that man-made climate change is to blame for certain [extreme weather events](#). But they did do that for the Louisiana flooding, which NOAA said had its chances boosted by 40 percent because of heat-trapping gasses.

NASA chief climate scientist Gavin Schmidt said the records keep showing the planet warming and "since we kind of predicted these things we know what we're talking about."

Perhaps the most noticeable case of this being predicted was in a 1988 study by James Hansen, Schmidt's predecessor as head of NASA's Goddard Institute for Space Studies .

In that study, using what scientists now call a crude computer model, Hansen forecast what would likely happen to Earth's climate. With one of his scenarios, Hansen not only got the global temperature rise about right, he forecast big changes in the number of days when the overnight temperatures would not go below 75 and the daytime highs would exceed 95 in four cities by the 2010s.

He was right—or underestimated how hot it would be—in six of eight categories.

"The fact it's come out with more or less around what was predicted is not surprising," Hansen said. "The summer is when things show up easiest because the natural variability is the least in the [summer](#). You notice the change more readily in the warm season."

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