

- Mark your confusion.
- Purposefully annotate the article (1-2 mature, thoughtful responses per page to what the author is saying)
- Write a 250+ word response to the article.

(If you are a teacher or student who would like to modify this Google Doc, go to File > Make a Copy. I cannot and do not respond to Share requests -- my apologies!)

Has climate change arrived?

By *The Week* Staff, September 6, 2020

The connection between hellacious weather and man-made climate change is becoming undeniable. Here's everything you need to know:

What has shifted?

For years, climate scientists have been wary of attributing extreme weather directly to man-made atmospheric warming, but that's changing in the face of historic heat waves and cascading natural disasters. In recent weeks alone, a "derecho," a complex of unusually powerful, hurricane-like storms, tore through the Midwest, destroying homes and crops across a 745-mile path; Hurricane Laura crashed into the Gulf Coast with sustained 150-mph winds; and hundreds of California wildfires incinerated an area the size of Rhode Island in just a week. The Southwest suffered a punishing heat wave with a high of 130 in Death Valley, perhaps the hottest day in world history. It followed highs of 125 in Iraq and a record 100-degree day in the Siberian town of Verkhoyansk, a once-in-100,000-years event. These freak patterns, researchers say, are almost certainly the result of mankind pumping 2.6 million pounds of CO₂ into the atmosphere per second. "We've gotten to the point where, when it comes to extreme heat waves, there is almost always a human fingerprint," said UCLA climate scientist Daniel Swain.

How strange is recent weather?

The expression "500-year storm" is losing its meaning: Houston has suffered five of them in a five-year span. California's wildfires — ignited by 1,200 lightning strikes in a 72-hour span — produced the second- and third-worst blazes in state history, even without the aid of the fall's strong Santa Ana winds. The Atlantic coast has seen 10 named storms so far this season, a mark typically hit in October, and upcoming storms are projected to be twice as intense as usual, because of extremely warm ocean waters. Hurricanes have done \$335 billion in damage over the past three years, compared with \$38.2 billion across the entire 1980s, adjusted for inflation. Climate disasters of all types inflicted \$807 billion in damage during the 2010s, the hottest decade on record.

What's the link to climate change?

Weather patterns are shaped by an intricate web of **atmospheric** and **oceanic conditions**, which is why scientists traditionally resist drawing **causal links** between climate change and any one event. But when both rising temperatures and disasters become consistent and **pervasive**, the connection becomes obvious. The average daily highs in Northern California during wildfire season are 3 to 4 degrees warmer than they were in 1900. Warming of the planet's surface causes atmospheric instability than can producer stronger, more frequent storms, while rising ocean temperatures and unusually moist air spawn hurricanes that grow rapidly more powerful, then stall after making landfall and dump torrential rain.

Where is it worst?

The future of climate chaos is being previewed in northern latitudes, where a CO₂ domino effect plays out: Warm winters melt more snow, causing the ground to absorb more heat, which leads to dry soil that fuels wildfires and thaws permafrost, releasing carbon into the atmosphere. In Russia this summer, thawing permafrost caused a power-plant fuel tank to collapse, spilling more than 20,000 tons of diesel into the Ambarnaya River. Russia's average temperature was nearly 11 degrees above its January-to-April norm, the largest anomaly ever for any country. In February, Antarctica hit a record 69 degrees, causing a 120-square-mile chunk of glacier to break off.

How else is climate change felt?

Disrupted weather patterns are rippling around the globe, creating bizarre, almost **biblical catastrophes**. Extreme temperatures in the Indian Ocean caused drought and wildfires in Australia

while spawning cyclones in eastern Africa. The torrential rain there created perfect conditions for desert locusts, which reproduced at terrifying rates. By March, hundreds of billions of the finger-length insects swept across the region, devouring every crop in their path, and pushing tens of millions of Africans to the brink of starvation. People are even experiencing climate change through their sinuses. Airborne pollen increases as temperatures climb, which is why residents of Alaska, where warming is happening twice as fast as the global average, report especially bad allergies. "There's irrefutable data," said Jeffrey Demain, director of an Alaskan allergy center.

What does the future hold?

Much depends on the oceans, which play a critical role in absorbing CO₂ and heat, and regulating weather. "The amount of heat we have put in the world's oceans in the past 25 years equals 3.6 billion Hiroshima atom bomb explosions," said Lijing Cheng, a Beijing physics professor. Warming oceans are circulating more slowly — by about 15 percent in the Atlantic Ocean since 1950. The reduction in their moderating influence could cause warmer summers, colder winters, changing rainfall patterns, and more destructive storms. Climate change is no longer a theoretical threat. In California, average temperatures have climbed 1.8 degrees since 1980 while precipitation has dropped 30 percent, doubling the number of extreme-risk days for wildfires each year. A few weeks ago, rancher Taylor Craig drove for his life as flames raced toward his Northern California home. Later, sitting in a Walmart parking lot, Craig said he realized he had joined a new and growing club. "I'm a climate refugee," he said.

A CO₂ silver lining

The pandemic forced automobile and airplane travel to fall off a cliff, and satellite images of pollution in the atmosphere offered a striking before-and-after contrast. At the height of April's coronavirus lockdowns, Google's mobility data indicated that 4 billion people cut their travel in half. As a result, worldwide daily CO₂ emissions dropped by an estimated 18.7 million tons, falling to levels not seen since 2006. Reduced car, bus, and truck traffic contributed to 43 percent of the drop-off, although emissions from residential buildings ticked up 2.8 percent, mostly from people running air conditioners while stuck at home. Scientists, however, are not celebrating. They anticipate just a 7 percent decline in carbon emissions this year, and point to historical evidence of emissions shooting back up after declines during recessions or world wars. "It goes to show just how big a challenge decarbonization really is," said Zeke Hausfather, a climate scientist at the University of California, Berkeley. To reach the global emissions targets of the 2015 Paris climate accord, CO₂ would need to drop as it did in 2020 every year for the next decade.

Response option(s):

- In the first paragraph, UCLA climate scientist Daniel Swain claims, "We've gotten to the point where, when it comes to extreme heat waves, there is almost always a human fingerprint." Explain: What does Swain mean?
- What does Taylor Craig mean when he says he is a "climate refugee." (Define refugee using a dictionary or Google before answering this question.) Do you agree with his use of language? Explain.
- Summarize any point made in the article and respond.