

What are the causes of climate change? Why scientists say humans are to blame

January 16 2023, by Dinah Voyles Pulver



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Scientists around the world are striving to learn more about how rising average temperatures worldwide influence the weather. They say it's increasingly likely that climate change is making weather events more intense, more frequent or of longer duration.

It's punching up temperatures in [heat waves](#) and adding some percentage of rainfall to intense storms. It also may cause weather events to occur outside times or locations where they typically happened in the past.

But what is causing [climate change](#)? Why are [global temperatures](#) rising? And Is the [warming climate](#) to blame for wild weather events? Here's some key information:

What does climate change mean?

Weather is what you see outside the window. Climate is what occurs in an area over years or decades. Climate change is the difference seen in long-term trends in air, water and ocean temperatures and longer-term weather patterns.

Monitoring stations around the world add to a growing trove of information that reveals how temperature and rainfall are changing. Some have decades of measurements, while others have more than a century of data. In Japan, they've recorded the start of the cherry tree bloom for more than 1,200 years.

Scientists use these [historical records](#) to study the rise in global average temperatures. For example, records show how sap rises earlier in maple trees or when wildfire seasons start earlier. They know warmer temperatures delay ice formation on the Great Lakes, when the warmer water temperatures fuel more lake effect snow.

What is the most important cause of climate change?

The biggest influence on the planet's changing climate is the release of emissions into the atmosphere from burning oil, gas and coal to move people and goods from place to place and to create energy, according to the U.S. Environmental Protection Agency.

Here's how that works:

- Carbon dioxide and other naturally occurring gases have always existed in the atmosphere, keeping the world warm just as a greenhouse keeps tropical plants alive in the winter. Scientists see that "greenhouse effect" in ice cores, sediments and tree rings.
- Modern day measurements show CO₂ emissions are rising. Since 1958, the level of carbon dioxide in the atmosphere measured at the Mauna Loa Observatory in Hawaii has grown from 316 parts per million to 417 parts per million.
- Measured in such small amounts, the change might seem minuscule. However, because CO₂ has risen by more than 30% percent, NASA and other say the changes are having an out-sized impact on global average temperatures.
- National and international studies document how excess carbon dioxide traps excess energy and causes the planet to get hotter faster.

If CO₂ doubles above the pre-industrial levels benchmark, the draft of the latest National Climate Assessment said global temperatures could rise by 4.5–7.2 degrees, spawning deadly heat waves, [crop damage](#) and other cascading impacts around the world.

What are other causes of climate change?

- Manufacturing, mining and cutting down forests.
- Release of methane and nitrous oxide also contribute to the greenhouse effect.
- The El Niño Southern Oscillation, a pattern of changing water temperatures in the Pacific Ocean, can change weather patterns.
- Volcanic eruptions can produce [carbon dioxide emissions](#) that warm the Earth, but also aerosol particles that have a cooling effect.

How to stop climate change

So what can be done to prevent the dire consequences forecast if emissions and temperatures continue to rise?

Scientists with the United Nations and governments around the world say fossil fuel emissions must be slashed and soon to avoid "catastrophic consequences." To keep the increase in global [average temperatures](#) at 2.7 degrees compared to temperatures in the late 1800s, the world must reach "net zero" CO₂ emissions by 2050, according to the latest climate assessment.

The world can't slash all emissions, so reaching the result of net zero emissions requires removing [carbon dioxide](#) from the air through both natural and mechanical means, the United Nations Intergovernmental Panel on Climate Change has reported. That includes measures such as preserving and protecting forests and wetlands that store carbon and developing technologies that can effectively suck carbon from the air.

Other methods urged by the U.N. and others include living a less carbon-intensive lifestyle and increasing the use of renewable energy resources.

Even if the world does reach net zero emissions, the national climate assessment states it will be impossible to prevent some of the warming already in motion.

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Citation: What are the causes of climate change? Why scientists say humans are to blame (2023, January 16) retrieved 27 June 2024 from <https://phys.org/news/2023-01-climate-scientists-humans-blame.html>

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