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Climate Change.

(Global Warming)

kutumbakam

THE SCIENCE OF CLIMATE CHANGE: FACTUAL INFORMATION

Contrary to popular belief, the science of climate change is more reliable and widely accepted. But it might be challenging to distinguish fact from fiction due to the broad nature of the subject and the prevalence of misinformation. We've done our best to provide you with the most up-to-date scientific data here, along with an explanation of how we came to that conclusion.

It is common to portray climate change as a forecast produced by sophisticated computer models. Models are, however, only a small portion of the larger scientific foundation for climate change, despite the fact that they're fairly accurate.

Scientists have known the fundamental physics underlying why greenhouse gases like carbon dioxide cause warming for more than a century. These gases only make up a minor portion of the atmosphere, but they have a significant impact on climate because they prevent some of the planet's heat from escaping into space. The existence of liquid water and life on a planet so far from the sun is due to the greenhouse effect.

But as people began using coal and other fossil fuels to run factories, smelters, and steam engines during the Industrial Revolution, more greenhouse gases were released into the atmosphere. Since then, global warming has been caused by human activity.

A substantial body of information, which starts with temperature readings obtained at weather stations and on ships beginning in the mid-1800s, has convinced us that this is the case. Later, scientists started using satellites to monitor surface temperatures and started looking for signs of climate change in the rocks. Together, these facts demonstrate a single trend: the planet is becoming hotter.v There has never been a warming like this in recent geologic time. The hockey-stick graph, a well-known graphic that was initially presented in 1998, depicts how temperatures were relatively flat for centuries before abruptly moving upward (the blade). It is supported by information from ice cores, tree rings, and other natural markers. Earth is currently hotter than it has been in at least 1,000 years, and probably much longer, according to the basic picture, which has weathered decades of scrutiny from climate scientists and detractors alike.

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Because the ocean has absorbed 90% of the heat trapped by greenhouse gases, surface temperatures actually conceal the true scope of climate change. Every layer of the ocean is warming, according to data gathered over the past 60 years by oceanographic expeditions and networks of floating equipment. One study found that between 1997 and 2015, the ocean absorbed as much heat as it had over the previous 130 years.

Additionally, we are aware of climate change because we can see its impacts all around us. While sea levels are rising, ice sheets and glaciers are thinning. Sea ice in the Arctic is melting. Snow melts more quickly in the spring, and plants bloom early. In search of cooler climates, animals are relocating to higher altitudes and latitudes. Also getting worse are wildfires, floods, and droughts. Many of these changes were foreseen by models, but observations reveal they are now materialising.

HOW DO WE KNOW CLIMATE CHANGE IS CAUSED BY HUMANS?

To understand the processes that can cause the earth to warm or cool, scientists have researched past climate shifts. The most significant ones include variations in solar energy, ocean circulation, volcanic activity, and atmospheric concentrations of greenhouse gases. And they have all occasionally had a part to play.

For instance, regions of the world chilled to the point where Londoners could regularly ice skate on the Thames 300 years ago due to a combination of decreased solar output and increased volcanic activity. The Northern Hemisphere was thrust into a freezing state about 12,000 years ago due to significant changes in the Atlantic circulation. And 56 million years ago, the earth unexpectedly warmed by at least 9 degrees Fahrenheit due to a massive release of greenhouse gases caused by volcanic activity or massive methane deposits (or both). This change in temperature disrupted the climate, choked the oceans, and caused major extinctions.

Scientists have examined each of these elements in an effort to pinpoint the origin of the current climatic shifts. The first three have varied much throughout the past few centuries, and they most likely only had minor effects on climate before 1950. However, they are unable to explain the planet's rapid temperature increase, particularly during the second half of the 20th century, when volcanic eruptions had a cooling effect and solar output actually decreased.

The best explanation for that warming is an increase in greenhouse gas concentrations. The impact of greenhouse gases on the climate is significant (see the next question for why). Since the Industrial Revolution, people have been releasing increasing carbon dioxide into the atmosphere, mostly through the extraction and burning of fossil fuels like coal, oil, and gas.

Prior to 1750, the atmosphere's carbon dioxide concentration was around 280 parts per million, according to bubbles of old air frozen in ice. Around 1900, it gradually increased until it surpassed the 300 p.p.m. mark. As cars and energy became more prevalent in modern life, CO2 levels then increased, lately reaching 420 p.p.m. Methane has more than doubled in concentration, making it the second-most significant greenhouse gas. Compared to 56 million years ago, we are generating carbon at a considerably higher rate.

According to another study, the likelihood of the current warming occurring without human-caused greenhouse gas emissions is less than 1 in 100,000.

However, human activity doesn't simply result in the release of greenhouse gases into the atmosphere. Additionally, particulate pollution from burning fossil fuels cools the globe by reflecting sunlight. According to scientists, this pollution has obscured up to 50% of the warming caused by greenhouse gases that would have otherwise occurred.v

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