

CERTAIN AND UNCERTAIN

Human activities change the earth's atmosphere.

Scientists know for certain that human activities are changing the composition of Earth's atmosphere. Increasing levels of greenhouse gases in the atmosphere, like carbon dioxide (CO₂), have been well documented since pre-industrial times.

There is no doubt this atmospheric buildup of carbon dioxide and other greenhouse gases is largely the result of human activities.

It's well accepted by scientists that greenhouse gases trap heat in the Earth's atmosphere and tend to warm the planet. By increasing the levels of greenhouse gases in the atmosphere, human activities are strengthening Earth's natural greenhouse effect. The key greenhouse gases emitted by human activities remain in the atmosphere for periods ranging from decades to centuries.

A warming trend of about 1°F has been recorded since the late 19th century. Warming has occurred in both the northern and southern hemispheres, and over the oceans. Confirmation of twentieth-century global warming is further substantiated by melting glaciers, decreased snow cover in the northern hemisphere, and even warming below ground.

Uncertain

The long-term effects of global warming

Scientists have identified that our health, agriculture, water resources, forests, wildlife, and coastal areas are vulnerable to the changes that global warming may bring. But projecting what the exact impacts will be over the twenty-first century remains very difficult. This is especially true when one asks how a local region will be affected.

Scientists are more confident about their projections for large-scale areas (e.g., global temperature and precipitation change, average sea level rise) and less confident about the ones for small-scale areas (e.g., local temperature and precipitation changes, altered weather patterns, soil moisture changes). This is largely because the computer models used to forecast global climate change are still ill-equipped to simulate how things may change at smaller scales.

Some of the largest uncertainties are associated with events that pose the greatest risk to human societies. IPCC cautions, "Complex systems, such as the climate system, can respond in non-linear ways and produce surprises." There is the possibility that a warmer world could lead to more frequent and intense storms, including hurricanes.

Preliminary evidence suggests that, once hurricanes do form, they will be stronger if the oceans are warmer due to global warming. However, the jury is still out whether or not hurricanes and other storms will become more frequent.

IPCC stands for The Intergovernmental Panel on Climate change. Its role is to assess scientific, technical and socio-economic information to determine the risk of human-induced climate change and the options available for adapting to these changes.

Greenhouse gases contribute to global warming.

Determining to what extent the human-induced accumulation of greenhouse gases since pre-industrial times is responsible for the global warming trend is not easy.

This is because other factors, both natural and human, affect our planet's temperature. Scientific understanding of these other factors—most notably natural climatic variations, changes in the sun's energy, and the cooling effects of pollutant aerosols—remains incomplete or uncertain; however...

- The Intergovernmental Panel on Climate Change (IPCC) stated there was a "discernible" human influence on climate; and that the observed warming trend is "unlikely to be entirely natural in origin."

- In the most recent Third Assessment Report (2001), IPCC wrote "There is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities."

In short, scientists think rising levels of greenhouse gases in the atmosphere are contributing to global warming, as would be expected; but to what extent is difficult to determine at the present time.

As atmospheric levels of greenhouse gases continue to rise, scientists estimate average global temperatures will continue to rise as a result. By how much and how fast remain uncertain. IPCC projects further global warming of 2.2 - 10°F (1.4 - 5.8°C) by the year 2100.

Source: <https://www.e-education.psu.edu/egee102/node/1960>