

Some Basics about Global Warming and Climate Change

Greenhouse Effect, Global Warming, Climate Change: What do these terms mean?

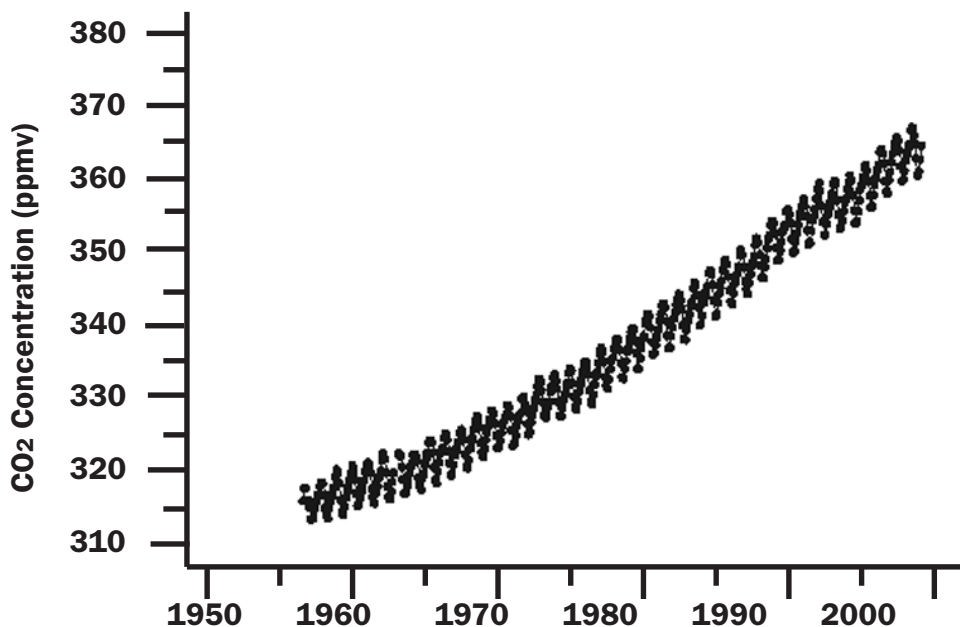
For most of human history, changes in the earth's climate resulted from natural causes that usually took place over hundreds or thousands of years. But today, human activities are beginning to affect our climate in serious and immediate ways, intensifying the "greenhouse effect."

The greenhouse effect is the natural phenomenon that keeps the earth at the right temperature for life to flourish. The sun's enormous energy warms the earth's surface and its atmosphere. As this energy radiates back toward space as heat, a portion is absorbed by a delicate balance of heat-trapping gases in the atmosphere, among them carbon dioxide, which creates an insulating layer. This insulating layer functions much like the glass windows of a greenhouse and elevates temperatures here on earth. Without it, the earth could not sustain life.

Human contributions to greenhouse gases have led to an "enhanced greenhouse effect" often referred to as global warming. As the concentration of greenhouse gases grows, more heat is trapped by the atmosphere and less escapes back into space. This increase in trapped heat alters atmospheric processes and their interaction with the oceans and the land. The climate, the product of that interaction, changes as well, causing altered weather patterns that bring unexpected rain or dry spells; sudden, severe storms; and temperature changes. The term climate change is used to describe this interconnected chain of events.

What causes climate change?

Scientists have concluded that human activities are contributing to climate change by adding large amounts of heat-trapping gases to the atmosphere. Our fossil fuel use is the main source of these gases. Every time we drive a car, use electricity from coal-fired power plants, or heat our home with oil, we release carbon dioxide. Since preindustrial times, the atmospheric concentration of carbon dioxide has increased 32 percent from about 275 ppm to 364 ppm (in 1997).



Source: Dave Keeling and Tim Whorf (Scripps Institution of Oceanography)

Over that same period, the amount of atmospheric methane, a potent greenhouse gas, has risen 145 percent. Sources of methane include agricultural activities and decaying garbage in our landfills. If emissions of greenhouse gases continue to grow, carbon dioxide concentrations will approach twice their preindustrial level by the end of the twenty-first century.

How do we know it's happening?

Temperature is one sign of global climate change. The ten warmest years this century have occurred since 1980. However, temperature is only one indicator. Studies show that during the last century an increase in precipitation worldwide has also occurred. These two phenomena—along with a decrease in the amount of snow that covers the northern hemisphere, a simultaneous decrease in Arctic sea ice, continued melting of alpine glaciers, and a rise in sea level—are all consistent with global warming.

How much warmer is our Earth likely to become?

The 1995 report from the Intergovernmental Panel on Climate Change projects that Earth's average temperature will increase 1.8 degrees to 6.3 degrees Fahrenheit in the next 100 years. This increase is in addition to the increase of 0.5 degrees to 1.1 degrees Fahrenheit that has already occurred since 1860. Scientists predict that even if we stop emitting heat-trapping gases now, the climate won't stabilize for many decades because of the gases we've already sent into the atmosphere.

Would a temperature increase of one or two degrees really change the global climate?

Even a modest rise of temperature could have dramatic effects. In the last 10,000 years, Earth's average temperature hasn't varied by more than 1.8 degrees Fahrenheit. Temperatures only 5 degrees to 9 degrees Fahrenheit cooler than those today resulted in the last Ice Age, in which the Northeast was covered by one kilometer of ice.

Even though a 2 degree to 3 degree Fahrenheit increase may not seem like a lot, this temperature rise is happening at the most rapid rate of change in recorded history. It is this rapid rate of change that people, plants, and animals may not be able to adjust to.

An increase of a few degrees won't generally make for pleasantly warmer temperatures around the globe, either. Some regions may be affected more than others. Some may receive less rainfall, with severe impacts on agriculture and forests. Others may lose coastal wetlands through rises in sea level. Agriculture in low-lying areas, such as along the Mississippi River, could be severely affected by floods. Scientists predict that continued global warming is likely to result in

- a rise in sea level between 6 and 37 inches and consequent coastal flooding;
- severe stress on forests, wetlands, and other ecosystems;
- damage to human health as mosquitoes and other insects spread diseases over larger geographical areas; and
- disruption of agriculture through changes in temperature and water resources.

What is the best source of scientific information on climate change?

In 1988, the United Nations Environment Programme and the World Meteorological Organization set up the Intergovernmental Panel on Climate Change (IPCC) to examine the most current scientific information on global warming and climate change. More than 2,500 of the world's leading climate scientists, economists, and risk-analysis experts from 80 countries contributed to the panel's most recent report, *Climate Change 1995: The IPCC Second Assessment Report*. These scientists worked together to determine what this information indicates about the global climate and about the impact of human actions on it. In this report the panel concluded that "the balance of evidence suggests that there is a discernible human influence on global climate."

Global Climate Change Viewpoint Form

Viewpoint

Write a one or two sentence summary of the information in this source.

Additional or supplementary information

Source

Author or organization:

Title (of article or webpage):

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