



GLOBAL CLIMATE CHANGE

Vital Signs of the Planet

- Home
- Key Indicators
- Evidence
- Causes
- Effects
- Uncertainties
- NASA's Role
- Missions
- Key Websites
- INTERACTIVES
- IMAGES AND VIDEO
- CLIMATE KIDS
- FOR EDUCATORS
- NASA CLIMATE DAY
- ENERGY INNOVATIONS
- SUBSCRIBE TO NEWSLETTER

Search

FREQUENTLY ASKED QUESTIONS

SHARE | PRINT | RSS

If climate changes naturally over time, why isn't the current warming just another natural cycle?

What's the difference between global change and climate change?

What does ozone layer depletion have to do with climate change?

Why does the temperature record shown on your climate key indicators page begin at 1850?

What is the greenhouse effect?

What is the Intergovernmental Panel on Climate Change (IPCC)?

How do we know what pre-industrial greenhouse gases and temperatures were?

If we stop all greenhouse gas emissions, will global climate change stop?

What is the role of the sun and solar cycles in climate change and global warming?

What does NASA have to do with global climate change?

Is there anything I can do to about global climate change?

(For more answers to climate questions, see the Earth Observatory [Climate Q&A](#).)

If climate changes naturally over time, why isn't the current warming just another natural cycle?

The industrial activities that our modern civilization depends upon have raised atmospheric concentrations of carbon dioxide and methane to higher levels than at any point during the last 650,000 years. Scientists agree it is very likely that most of the global average warming since the mid-20th century is due to the human-induced increases in greenhouse gases, rather than to natural causes.

While natural variations have altered the climate significantly in the past, it is very unlikely that the changes in climate observed since the mid-20th century can be explained by natural processes alone.

[Top of Page](#)

What's the difference between global change and climate change?

While global change and climate change are often used interchangeably, global change encompasses broader changes to all aspects of our world including areas such as the availability of water resources, sea-level rise, ocean acidification, and biodiversity. Climate change is used to emphasize the specific changes most commonly associated with the atmosphere and the "average weather," including temperature, humidity, cloudiness, or precipitation changes.

[Top of Page](#)

What does ozone layer depletion have to do with climate change?

Ozone depletion, which has produced "ozone holes" above Earth's poles, is caused by human-produced compounds that release chlorine and bromine gases in the stratosphere.

Ozone depletion does not contribute to global warming. Because ozone in the upper atmosphere absorbs heat radiating from below, stratospheric ozone depletion actually allows additional heat to escape into space. While this occurs worldwide, the depth of the springtime ozone hole over Antarctica results in Antarctica cooling while the rest of the Earth warms.

Greenhouse gases tend to cool the upper region of the atmosphere, where the ozone layer is located. Because the chemical reactions that cause ozone depletion happen more quickly in the presence of ice crystals, a colder upper atmosphere with more ice will probably cause the ozone hole to expand slightly.

[Top of Page](#)

Why does the temperature record shown on your climate key indicators page begin at 1880?

That happens to be when most of the land areas of the northern hemisphere started to report surface temperatures measured by thermometer to government weather authorities, who recorded and archived them. Scientists call this the "instrumental record" of climate. Prior to 1880, there are not enough of these instrumental records from enough of the world to produce estimates of global temperatures. Instead, temperatures from further back in the past are reconstructed from proxy records like tree rings, pollen counts, boreholes and ice cores. They're less accurate, and because they're fundamentally different kinds of data, scientists don't generally put these proxy-based temperatures on the same chart as the instrument-derived temperatures.

[Top of Page](#)

What is the greenhouse effect?

This refers to the retention of the sun's warmth in Earth's lower atmosphere by greenhouse gases, which behave somewhat like the glass in a greenhouse.

These gases - primarily carbon dioxide, methane and nitrous oxide - act as a thermal blanket for the planet, warming the surface to a life-supporting average of 59 degrees Fahrenheit (15 degrees Celsius). The recently observed climate change is attributed to an accelerated greenhouse effect, caused by a boost in the levels of these gases in the atmosphere.

[Top of Page](#)

What is the Intergovernmental Panel on Climate Change (IPCC)?

The IPCC is a scientific intergovernmental body set up by the World Meteorological Organization and by the United Nations Environment Program to provide the decision-makers and others with an objective source of information about climate change.

The IPCC brings together the world's top scientists in all relevant fields to provide reports based on scientific evidence and reflecting existing viewpoints within the scientific community. [Click here to view the organization's most recent report series on global climate change.](#)

[Top of Page](#)

How do we know what pre-industrial greenhouse gases and temperatures were?

Scientists have reconstructed past climate conditions through evidence preserved in tree rings, coral reefs and ice cores. For example, ice cores removed from 2 miles deep in the Antarctic contain atmospheric samples trapped in tiny air bubbles that date as far back as 650,000 years. These samples have allowed scientists to construct a historical record of greenhouse gas concentration and temperature stretching back hundreds of thousands of years.

[Top of Page](#)

If we stop all greenhouse gas emissions, will global climate change stop?

Industrial activity has already pumped billions of tons of greenhouse gases into the atmosphere, and we have yet to see the full effect of warming from those gases. A great deal of excess energy imbalance is stored in the ocean and will be released gradually over time, continuing to warm the planet.

In other words, some degree of climate change is irreversible. Scientists call this the "committed warming," and estimate that the Earth would continue to warm about 1 degree Fahrenheit (.6 degrees Celsius) even if greenhouse gas levels in the atmosphere stopped growing immediately. That is, if all human greenhouse gas emissions stopped tomorrow, the Earth would still warm for at least a half-century.

[Top of Page](#)

What is the role of the sun and solar cycles in climate change and global warming?

Since 1750, the average amount of energy coming from the sun either remained constant or increased slightly. Estimates of the amount of energy the sun has sent to Earth are based on sunspot records dating back more than two centuries, and other proxy indicators, such as the amount of carbon in tree rings.

More recently, satellite observation of solar activity from space suggest a slight increase in solar activity, but the change can't account for more than 10 percent of the warming trend seen during the past century.

[Top of Page](#)

What does NASA have to do with global climate change?

The agency's mission is to provide the scientific data needed to understand climate change and to evaluate the impact of efforts to control it.

NASA instruments, data, analysis and modeling contributed significantly the scientific reports on climate change issued by the United Nations Intergovernmental Panel on Climate Change (IPCC) - work that was awarded the Nobel Peace Prize in 2007.

[Top of Page](#)

Is there anything I can do to about global climate change?

A list of external resources with suggestions for individual action is provided in the [Resources](#) section of this website.

[Top of Page](#)



Global Climate Change is produced by the Earth Science Communications Team at
NASA's Jet Propulsion Laboratory/California Institute of Technology

Site Editor: Amber Jenkins
Manager: Randal Jackson
Webmaster: Cecelia Lawshe

[Jet Propulsion Laboratory](#) | [Earth Observatory](#) | [Climate Change FAQ](#) | [Feedback](#) | [Site Map](#) | [Privacy](#) | [Awards and Credits](#)