

CLIMATE CHANGE

SCIENCE

The Earth is getting warmer

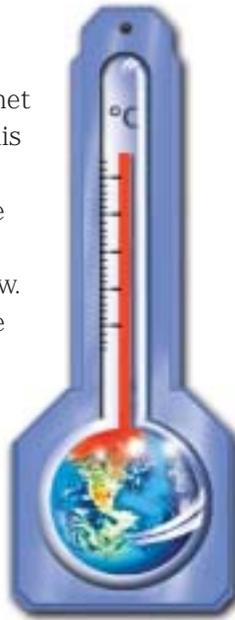
Over the past 100 years, the average temperature on Earth has increased by more than half a degree Celsius. In fact, the 1980s and 1990s were the warmest decades on record, and the 20th century the warmest in the past 1000 years.

All predictions are that the warming will continue. According to the Intergovernmental Panel on Climate Change (IPCC), an international organization bringing together the world's top climate scientists, average global temperatures are expected to rise by 1.4 to 5.8° Celsius over the next century. In Canada, average temperatures in some regions, particularly the north, could rise by as much as 5 to 7° Celsius. To put that in perspective, today's average global temperatures are only about 5° warmer than they were during the last Ice Age. In North America, this small change in average temperatures was enough to melt the vast ice sheets that once covered much of the continent.

The greenhouse effect

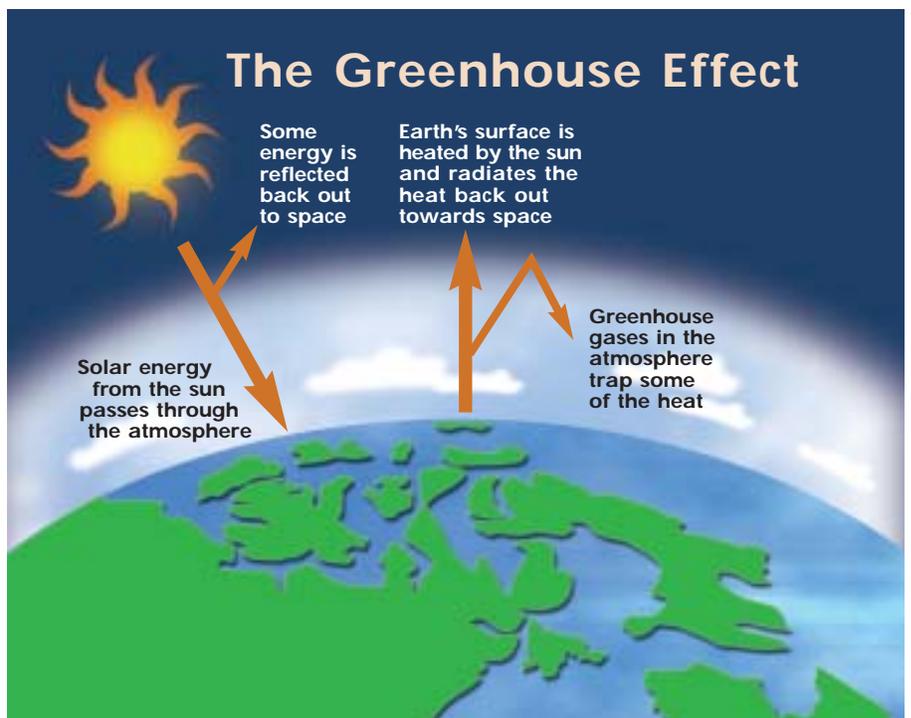
Gases in our atmosphere, including water vapour, carbon dioxide, methane, and nitrous oxide,

act like a greenhouse to keep the sun's heat in and help make our planet livable. Without this natural insulation, the Earth's surface would be much colder than it is now. In fact, the average temperature on Earth would be -18° Celsius, too cold to support the diversity of life that now exists.



Enhancing the greenhouse effect

Since the Industrial Revolution, developed countries have produced increasing quantities of greenhouse gases, due to the burning of fossil fuels such as coal, oil, and natural gas to drive our vehicles, power our industries, and heat and cool our homes. Other human activities, such as the clearing of land for agriculture and urban development, and landfilling and other waste disposal methods, are also adding to the concentrations of greenhouse gases in our atmosphere.



Climate Change. Are you doing **your bit**?

As a result, concentrations of carbon dioxide in the atmosphere have increased by 31 per cent since 1895. Concentrations of methane and nitrous oxide, which are also related to human activities, have increased by 151 per cent and 17 per cent respectively during the same period. Increased concentrations of greenhouse gases in our atmosphere are enhancing the natural greenhouse effect, causing the Earth to become warmer.

In Canada, greenhouse gas emissions in 2000 were 15 per cent greater than they were in 1990. Canada accounts for just 2.5 per cent of global greenhouse gas emissions, but is the world's third largest per capita emitter of these gases, after the United States and Australia.

// There is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities... //

*Climate Change 2001:
The Scientific Basis,
Intergovernmental Panel
on Climate Change (IPCC)
www.ipcc.ch*

How do we know about past climate?

Modern temperature records only go back to about 1860. But scientists study sediment cores from the bottoms of oceans and lakes, tree rings, glacier ice cores, and other data sources to learn about changes in climate over thousands of years.

"What are the Greenhouse Gases?"

Water vapour is the most common greenhouse gas. However, three others are of particular importance to climate change because they are closely associated with human activities:



Carbon dioxide

Carbon dioxide (CO₂) is released into the atmosphere through natural processes of plant and animal life and through human activities, primarily the burning of fossil fuels and other materials. It is the main contributor to climate change. Photosynthesis, the process by which plants take in carbon dioxide, removes carbon dioxide from the atmosphere.



Methane

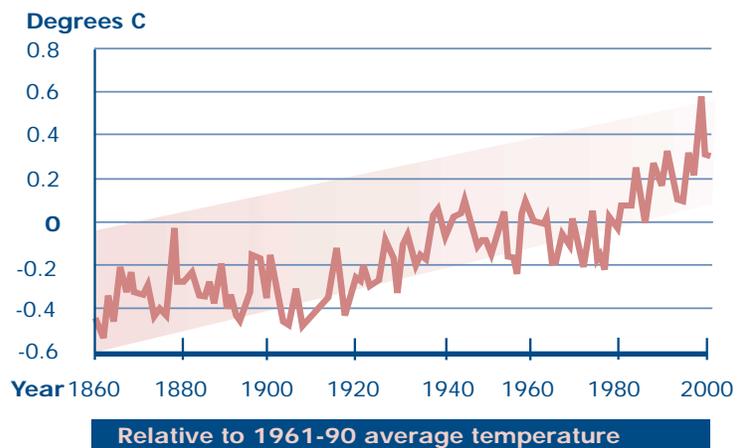
Methane (CH₄) is not as abundant as carbon dioxide, but is a powerful greenhouse gas and more effective at trapping heat. It is created when vegetation is burned, digested, or rotted in an oxygen-free environment. Wetlands, rice paddies, animal digestive processes, and decaying garbage are the greatest sources of methane in our atmosphere.



Nitrous oxide

Nitrous oxide (N₂O) occurs naturally in the environment, but human activities are increasing the quantities. Nitrous oxide is released when chemical fertilizers and manure are used in agriculture.

Global temperatures are rising



Source: National Oceanic and Atmospheric Administration (NOAA)

Want to know more about climate change?

Visit the Government of Canada climate change Web site at:
www.climatechange.gc.ca
or call toll-free: **1 800 O-Canada**
(1 800 622-6232)
or TTY 1 800 465-7735 and ask
for a climate change information kit.

Canada

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