










Global Warming

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Global temperatures on both land and sea have increased by 0.75 °C (1.4 F) relative to the period 1860-1900, according to the instrumental temperature record.

Temperature is believed to have been relatively stable over the one or two thousand years before 1850, with possibly regional fluctuations such as the Medieval Warm Period or the Little Ice Age.

A black and white photograph showing a narrow waterway between large, jagged icebergs. The water is dark and reflects the light from the sky. The icebergs are massive and have a textured, crystalline appearance. The sky is bright and overcast.

Based on estimates NASA's Goddard Institute for Space Studies, 2005 was the warmest year since reliable, widespread instrumental measurements became variable in the 1800s, exceeding the previous record set in 1998 by a few hundredths of a degree.

Estimates prepared by the World Meteorological Organization and the ZUK Climatic Research Unit conclude that 2005 was the second warmest year, behind 1998.

Adding carbon dioxide (CO₂) or methane CH₄) to Earth's atmosphere, with no other changes, will make the planet's surface warmer. Greenhouse gases create a natural greenhouse effect without which temperatures on Earth would be an estimated 30 °C (54 °F) lower, so that Earth would be uninhabitable.



It is therefore not correct to say that there is a debate between those who “believe in” and “oppose” the greenhouse effect as such. Rather, the debate concerns the net effect of the addition of greenhouse gases when allowing for positive or negative feedback.

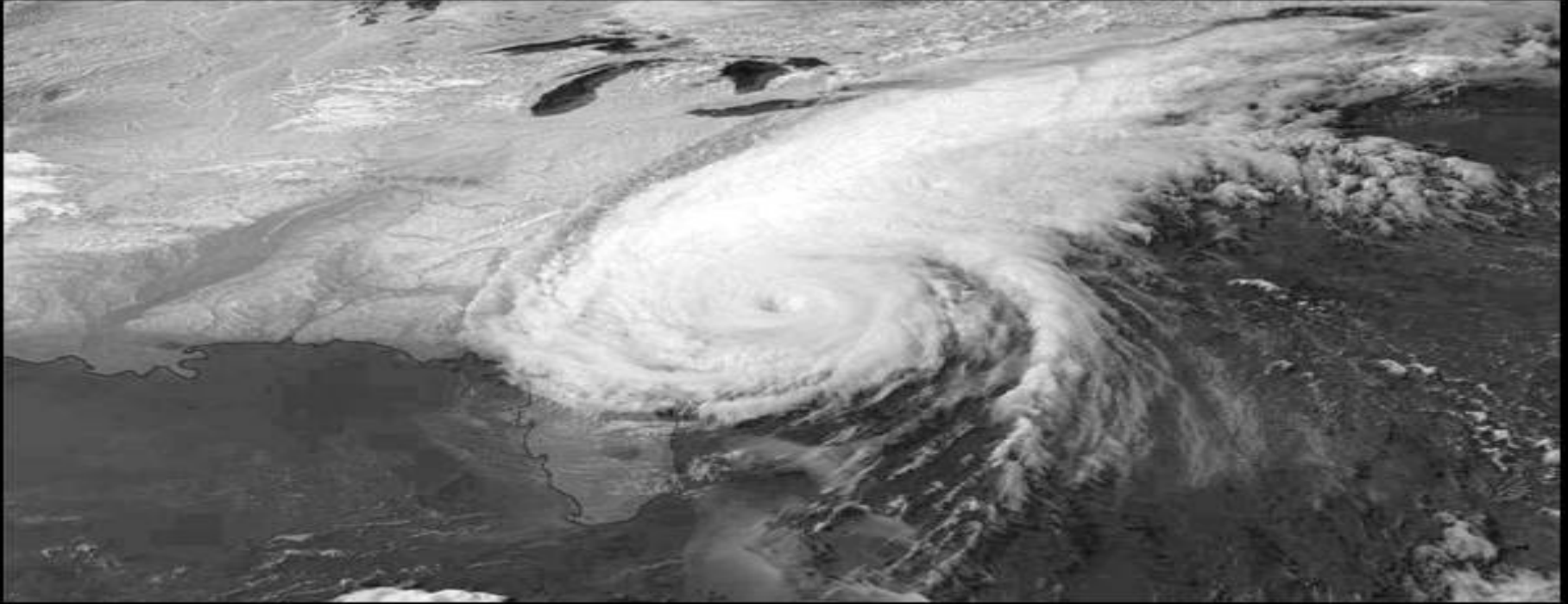


The atmospheric concentrations of CO₂ and methane (CH₄) have increased by 31% and 149% respectively above pre-industrial level since 1750. This is considerably higher than at any time during the last 650,000 years, period for which reliable data has been extracted from ice cores. From less direct geological evidence it is believed that CO₂ values this high were last attained 20 million years ago.

About three-quarters of the anthropogenic (man-made) emissions of CO₂ to the atmosphere during the past 20 years are due to fossil fuel burning. The rest of the anthropogenic emissions are predominant due to land-use change, especially deforestation.

Future CO₂ levels are expected to rise due to ongoing burning of fossil fuels and land-use change. The rate of rise will depend on certain economic, sociological, technological, natural developments but may be ultimately limited by the availability of fossil fuels.

The IPCC Special Report on Emissions Scenarios gives a wide range of future CO₂ scenarios, ranging from 541 to 970 parts per million by the year 2100. Fossil fuel reserves are sufficient to reach this level and continue emission past 2100, if coal, tar sands or methane clathrates are extensively used.



A 2001 report by the IPCC suggests that glacier retreat, ice shelf disruption such as the Larsen Ice Shelf, sea level rise, changes in rainfall patterns, increased intensity and frequency of hurricanes and extreme weather events, are being attributed at least in part to global warming. While changes are expected for overall patterns, intensity, and frequencies, it is difficult or impossible to attribute *specific* events (such as Hurricane Katrina) to global warming.

Some anticipated effects include sea level rise of 110 to 770 mm (0.36 to 2.5 feet) by the 2100, repercussions to agriculture, possible slowing of the thermohaline circulation, reductions in the ozone layer, increased intensity and frequency of the hurricane and extreme weather events, lowering ocean pH, and the spread of diseases such as malaria and dengue fever.



One study predicts 18 to 35 percent of a sample of 1,103 animal and plant species would be extinct by 2050, based on future projections. However, few mechanistic studies have documented extinctions due to recent climate change.

The broad agreement among the climate scientist that global temperatures will continue to increase has led nations, states corporations and individuals to implement actions to try to curtail global warming.

Some of the strategies that have been proposed for mitigation of global warming include development of new technologies; carbon offsets; renewable energy such as wind power, solar power; nuclear power; electric or plug-in hybrid electric vehicles; non-fossil fuel cells; energy conservation; carbon taxes; improving natural carbon dioxide sinks; deliberate production of sulfate aerosols, which produce a cooling effect on the Earth; population control; carbon capture and storage; nanotechnology; a environmental vegetarianism.

Many environment groups encourage individual action against global warming, often aimed at the consumer, and there has been business action on climate change.



Kyoto Protocol is an amendment to the United Nations Framework Conversation on Climate Change (UNFCCC). Countries that ratify this protocol commit to reduce their emissions of CO₂ and five other greenhouse gases, or engage in emissions trading if they maintain or increase emissions of these gases.

Developing countries are exempt from meeting Kyoto. This includes China and India, the second and third largest emitters of CO₂ behind the United States. The International Energy Agency predicts China will exceed total U.S. emissions before 2010.

REFERENCES

Climate Change 2007: The Physical Science Basis- Summary for Policymakers (<http://www.ipcc.ch/SPM2feb07.pdf>). Intergovernmental Panel on Climate Change (2007).

Retrieved on 2007-02-02.

Climate Change Policy (http://dpa.aapg.org/gac/papers/climate_change.cfm) (cfm). American Association of Petroleum Geologists. Retrieved on 2007-03-30.

Climate Change: Basic information (<http://epa.gov/climatechange/basicinfo.html>). U.S.

Environmental Protection Agency. Retrieved on 2007-02-09.

Climate Change 2001: Working Group I: The Scientific Basis, Chapter 12 (http://www.grida.no/climate/ipcc_tar/wg1/462.html)

Climate Change 2001: Working Group I: The Scientific Basis, Part 6 (http://www.grida.no/climate/ipcc_tar/wg1/006.html). Intergovernmental Panel on Climate Change (2001). Retrieved on 2007-01-18.

REFERENCES - CONTINUED

Climate Change 2001: Working Group I: The Scientific Basis, 3.7.3.3 SRES scenarios and their implications for future CO₂ concentration (http://www.grida.no/climate/ipcc_tar/wg1/123htm)

Climate Change 2001: Working Group I: The Scientific Basis, Chapter 12: Detection of Climate Change and Attribution of Causes (http://www.grida.no/climate/ipcc_tar/wg1/450htm)

Climate Change 2001: Working Group II: Impacts, Adaptation and Vulnerability. (http://www.grida.no/climate/ipcc_tar/wg2/index.htm). Retrieved on 2007-03-14.

Climate Change 2002: The Scientific Basis (http://www.grida.no/climate/ipcc_tar/wg1/409.htm). Retrieved on 2005-12-19

Duke University, *Sun's Direct Role in Global warming May Be Underestimated, Duke Physicist Report* (<http://www.dukenews.duke.edu/2005/09/sunwarm.html>), September 30, 2005. Retrieved February 11, 2007.

“Let no one be discouraged by the belief that there is nothing one man or one woman can do against the enormous array of the world's ills -- against misery and ignorance, injustice and violence... Few will have the greatness to bend history itself; but each of us can work to change a small portion of events, and in the total of all those acts will be written the history of this generation...”

– *Robert Francis Kennedy, speech at Day of Affirmation, University of Capetown, South Africa*