Conclusion

Current warming trends are unequivocal. It is very likely that greenhouse gases released by human activities are responsible for most of the warming observed in the past fifty years. These trends are projected to continue with greater intensity over the course of the 21st century and beyond.

GLOSSARY

Aerosol - An aerosol is a collection of microscopic particles, solid or liquid, suspended in a gas. Natural sources of aerosols include salt particles from sea spray, dust and clay particles from the weathering of rocks. Aerosols can also originate as a result of human activities and are often considered pollutants.

Atmosphere - The mass of air surrounding the Earth. The atmosphere consists of nitrogen (78%), oxygen (21%), and traces of other gases such as argon, helium, carbon dioxide, and ozone. The atmosphere plays an important role in the protection of life on Earth; it absorbs ultraviolet solar radiation and reduces temperature extremes between day and night.

Greenhouse gases - Greenhouse gases such as carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4) and ozone (O_3) are those gases of the atmosphere, both natural and anthropogenic, that absorb and emit radiation emitted by the Earth's surface, the atmosphere and clouds. This property causes the greenhouse effect.

Land use - The human use of a piece of land for a certain purpose (such as irrigated agriculture or recreation). Changes in land use may have an impact on the properties of the surface which can have implication for the climate, at a local or a global scale.

Facts on this publication

This publication is a faithful summary of ***Climate Change 2007: The Physical Science Basis Summary for Policymakers**** by the Intergovernmental Panel on Climate Change. *The Physical Science Basis* is the first part of a leading scientific consensus report produced in 2007: the ***IPCC Fourth Assessment Report*** (IPCC AR4). This summary was written by GreenFacts and peer reviewed by three independent experts.

The ***Intergovernmental Panel on Climate Change*** (IPCC) was set up in 1988 by the United Nations. The three working groups of the IPCC that contribute to the IPCC AR4 assess the science and the impacts of climate change, as well as mankind's options to mitigate climate change. The full report by the IPCC Working Group I is available on www.ipcc.ch.

A more detailed summary can be found on
www.greenfacts.org/en/climate-change-ar4/

*** At the time of production of this summary, the text and figures of the IPCC report were final but subject to copy-editing.**

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www.greenfacts.org | gf@greenfacts.org | Tel: +32 (0)2 211 34 88

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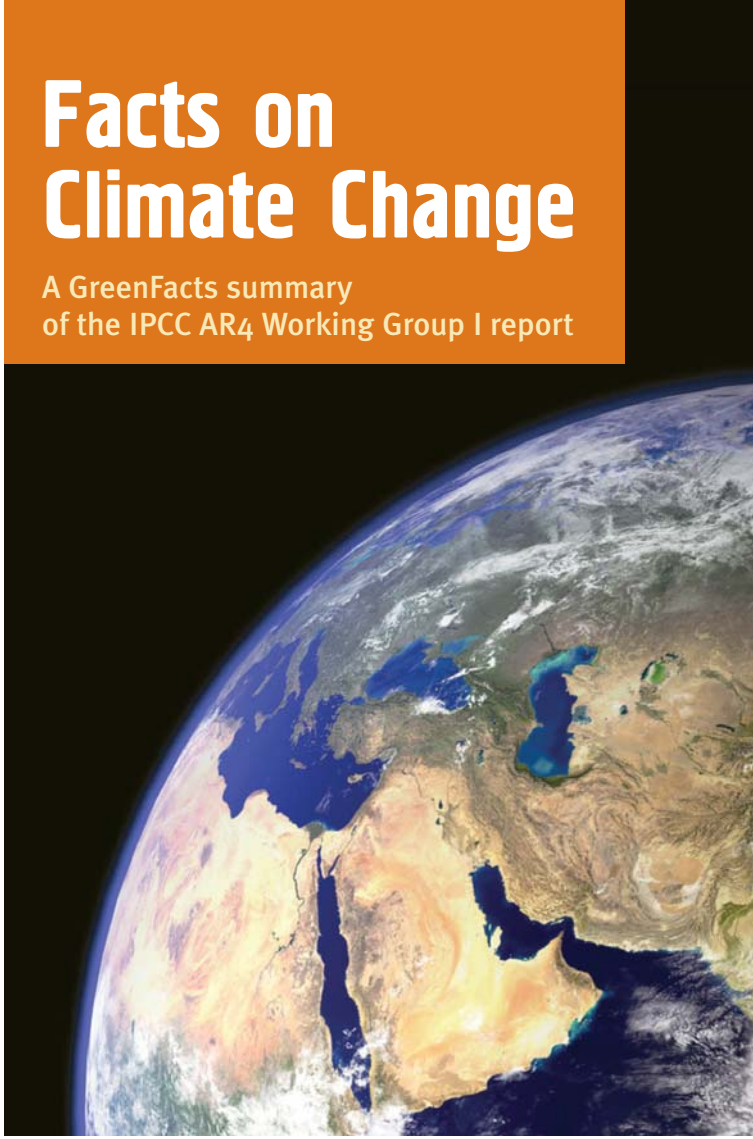
Facts on Climate Change

A GreenFacts summary of the IPCC AR4 Working Group I report



CLIMATE CHANGE – as it has evolved during the past decades – is likely to be largely due to human activities such as the burning of fossil fuels. How has the climate changed in the last decades and how is it projected to evolve over the coming century?

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What makes the climate change?

The Earth's climate is influenced by many factors, mainly by the amount of energy coming from the sun, but also by factors such as the amount of greenhouse gases and aerosols in the atmosphere, and the properties of the Earth's surface, which determine how much of this solar energy is retained or reflected back to space.

The atmospheric concentrations of greenhouse gases such as carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) have significantly increased since the beginning of the industrial revolution. This is mainly due to human activities, such as the burning of fossil fuels, land use change, and agriculture. For instance, the atmospheric concentration of carbon dioxide is now far higher than in the last 650 000 years and has been growing faster in the last ten years than it has been since the beginning of continuous measurements around 1960.

It is very likely that, overall, human activities since 1750 have had a global warming effect on the Earth.

Human emissions of greenhouse gases are likely to be the main cause of global warming

Regional changes such as increased intensity of tropical cyclones have been observed in the past 100 years.

How is climate changing and how has it changed in the past?

The warming of global climate is now unequivocal. There are many observations of increasing air and ocean temperatures, widespread melting of snow and ice, and rising sea levels.

More specifically, eleven of the last twelve years (1995-2006) rank among the 12 warmest years ever recorded since global surface temperatures are measured (1850). Over the last 100 years (1906–2005), global temperature has increased by 0.74°C. Global sea level has risen by 17cm during the 20th century, in part because of the melting of snow and ice from many mountains and in the polar regions. More regional changes have also been observed, including changes in Arctic temperatures and ice, ocean salinity, wind patterns, droughts, precipitations, frequency of heat waves and intensity of tropical cyclones.

The warmth of the last half century is unusual in at least the previous 1300 years. The last time that the polar regions remained significantly warmer than now for a very extended period *(125 000 years ago)*, the sea level rose by 4 to 6 meters.

Most of the increase in global temperature observed over the past fifty years is very likely due to human emissions of greenhouse gases.

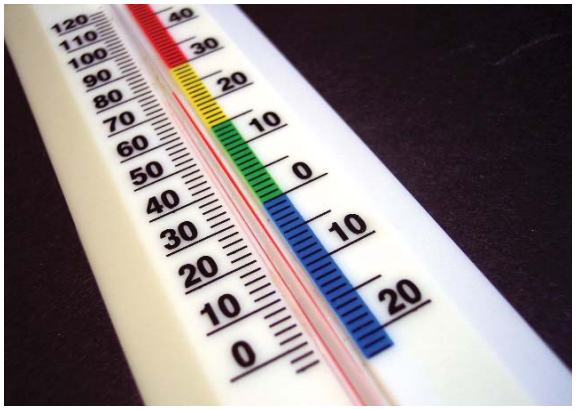
How is the climate going to change in the future?

The global average temperature is expected to increase by about 0.2°C per decade over the next two decades. Continuing greenhouse gas emissions at or above current rates would cause a further increase in global temperatures and many other climatic changes during the 21st century.

The best estimates for global temperature increase from the 1980s to the end of the 21st century range from 1.8°C to 4.0°C.

Global average sea level is expected to rise by 18 to 59 cm by the end of the 21st century. Warming is expected to be greatest over land and at high northern latitudes and smallest over the Southern Ocean and parts of the North Atlantic Ocean. Other projected changes include acidification of the oceans, reduced snow cover and sea ice, more frequent heat waves and heavy precipitation, more intense tropical cyclones, and slower oceanic currents.

Warming and sea level rise caused by human activities will continue for centuries, even if greenhouse gas concentrations were to be stabilized. If warming persists over many centuries, it could lead to a complete melting of the Greenland Ice sheet, increasing global sea levels by about 7m.



For the period of 1980 to the end of the 21st century, estimates for global temperature increase range from 1.8°C to 4.0°C.