



## Climate change: what we know so far

The term 'climate change' commonly means the rise in average temperature of the Earth's climate system as observed over the last century. This phenomenon is also known as 'global warming'.

### The difference between climate and weather

Weather is what forecasters on the radio, television or in newspapers predict every day. Weather forecasters tell people what to expect regarding temperature, rain and wind on a daily basis.

Climate is the average weather in a place over many years, usually 30 years but sometimes thousands of years.

Using data from archaeological investigations, tide gauges and satellite radars, scientists have been able to determine sea-level patterns past and present. They have identified a rise in sea levels in the 19th century, which has continued during the 20th century at a rate averaging 1.8 mm per year.

**Over the last two decades, this rate has increased to 3.3 mm per year.**

So what do these figures mean? At the very least, they tell us that the planet is warming at an accelerated rate. We need to understand why our planet is warming, and whether we can or should do anything about it.

### What is the extent of global warming?

Global warming is an increase in the amount of solar energy stored in the Earth's climate system. Most of this increase is absorbed in our oceans. And because water expands when it warms up, and melting ice adds more water to the oceans, a rise in global temperature means a rise in sea levels. In other words, **rising sea levels act as a global thermometer**, providing a means of measuring global warming over time.

### Why is climate change happening?

The explanation of climate change lies in our atmospheric 'greenhouse' gases. These gases – water vapour, methane and carbon dioxide – obstruct the loss of heat from the Earth's surface as it travels upwards. To work out the relationship between these gases and global temperatures, climate scientists have analysed gas bubbles in ice cores drilled from ice sheets and glaciers in the Antarctic and Greenland.

## Globally averaged combined land and ocean surface temperature anomaly

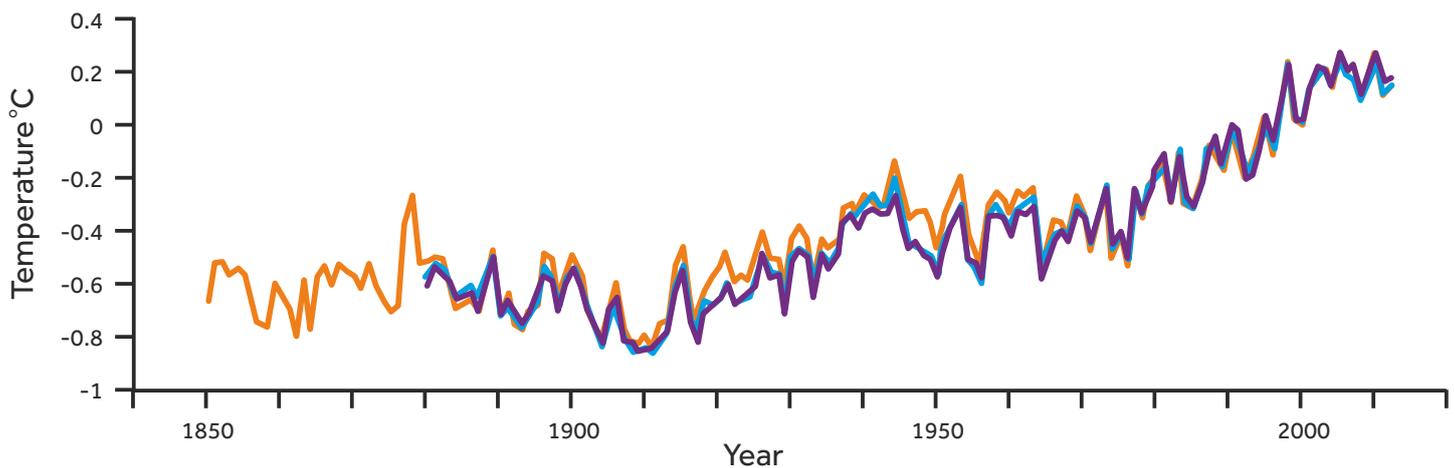


Figure 1: Annually and globally averaged combined land and ocean surface temperature anomalies relative to the average over the period 1986 to 2005. Colours indicate different data sets.

Source: IPCC (2014) *Climate Change 2014, Synthesis Report: Summary for Policymakers*. Figure SPM.1(a)

What the ice core investigations tell us is that in warm periods of the last 800,000 years, carbon dioxide concentrations peaked at around 300 ppm (parts per million). By comparison, carbon dioxide concentrations in 2014 passed 400 ppm.

There is compelling evidence that the recent increase in carbon dioxide emissions is the result of human activity since the industrial revolution of the 18th century, when we started to pump greenhouse gases into the atmosphere with greater intensity. Since this time, atmospheric concentrations of carbon dioxide have risen by 40%. Concern about the impact of such emissions led global leaders to establish in 1988 the Intergovernmental Panel on Climate Change (IPCC).

The IPCC was given the task of summarising all scientific data on climate change to inform the policy decisions of the United Nations Framework Convention on Climate Change. The IPCC concluded that human action is causing climate change, and said that global temperatures are likely to rise by 0.3°C to 4.8°C by the end of the century, depending on how much governments control carbon emissions.

According to the IPCC, a rise in temperature of more than 2°C by 2100 will be 'dangerous'. In order to keep global warming below 2°C by the end of the century, human carbon emissions have to drop to 50% of the present level by 2050 and thereafter drop to zero. Alternatively, if we stay at current rates of carbon use, we have 27 years left before we have burned the 800 gigatons of carbon that the IPCC sets as our upper limit.

### What does climate change mean for South Asia?

A warming climate brings huge risks for the natural world and human well-being. Scientists predict a number of problems, including increased risk of drought, fire, floods and storms, and more heat-related illness and disease. Some of these problems are already having serious effects in South Asia. Climate change will also affect farming and fishing, with probable economic losses and reductions in food security.

The impact and extent of these changes in the future is still uncertain. What we do know is that it is not too late for a shift to low-carbon technologies, and adaptive strategies, to curb future problems related to climate change. But we haven't got long.

"Boil down the IPCC report and here's what you find: climate change is real, it's happening now, human beings are the cause of the transformation, and only action by human beings can save the world from its worst impacts."

John Kerry, US Secretary of State

The main source for this leaflet was: 'Climate change is not just about science – it's about the future we want to create', Chris Rapley CBE and Duncan Macmillan, *The Guardian*, 22 November 2014.



ACTION ON CLIMATE TODAY

For more information, please email [info@actiononclimate.today](mailto:info@actiononclimate.today) or visit our website at [www.actiononclimate.today](http://www.actiononclimate.today)

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The opinions expressed in this leaflet are those of the authors and do not necessarily represent the views of the Department for International Development.