

Climate fear as CO₂ soars

Scientists bewildered as carbon levels rise sharply for second year running

Paul Brown

An unprecedented and unexplained rise in carbon dioxide in the atmosphere two years running has raised fears that the world may be on the brink of runaway global warming.

Scientists are baffled about why the quantity of the main greenhouse gas has leapt in a two-year period and are concerned that the Earth's natural systems are no longer able to absorb as much as in the past.

The findings were to be discussed this week by the UK government's chief scientist, Dr David King, at the annual Greenpeace business lecture.

Measurements of CO₂ in the atmosphere have been continuous for almost 50 years at Mauna Loa Observatory, 3,650m up a mountain in Hawaii, regarded as far enough away from any carbon dioxide source to be a reliable measuring point.

In recent decades CO₂ increased on average by 1.5 parts per million (ppm) a year because of the amount of oil, coal and gas burnt, but has now jumped to more than 2ppm in 2002 and 2003.

Above or below average rises in CO₂ levels in the atmosphere have previously been explained by natural events.

When the Pacific warms up during El Niño — a disruptive weather pattern caused by weakening trade winds — the amount of carbon dioxide rises dramatically because warm oceans emit CO₂ rather than absorb it.

But scientists are puzzled because over the past two years, when the increases have been 2.08ppm and 2.54ppm respectively, there has been no El Niño.

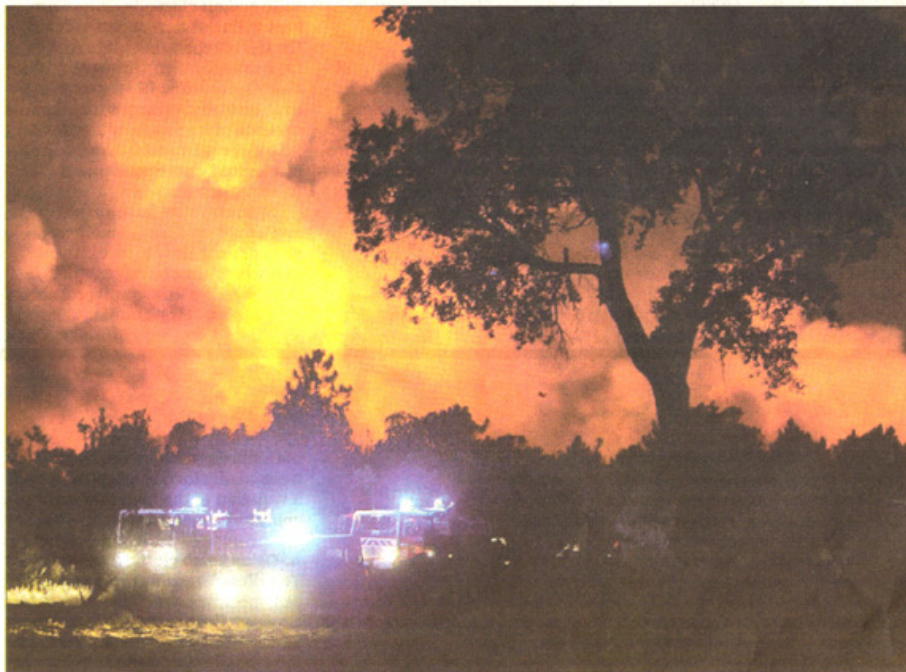
Charles Keeling, the man who began the observations in 1958, as a young climate scientist, is now 74 and still working in the field.

He said last weekend: "The rise in the annual rate to above two parts per million for two consecutive years is a real phenomenon."

"It is possible that this is merely a reflection of natural events like previous peaks in the rate, but it is also possible that it is the beginning of a natural process unprecedented in the record."

Analysts stress that it is too early to draw any long-term conclusions.

But the fear held by some scientists is that the greater than normal rises in CO₂ emissions mean that



Could last year's forest fires in Europe be to blame for the leap in carbon dioxide? Photograph: Olivier Hoslet/EPA

instead of decades to bring global warming under control we may have only a few years. At worst the figures could be the first sign of the breakdown in the Earth's natural systems for absorbing the gas.

That would herald the so-called runaway greenhouse effect, where the planet's soaring temperature becomes impossible to contain. As the icecaps melt, less sunlight is reflected back into space from ice and snow, and bare rocks begin to absorb more heat. This is already happening.

One of the predictions made by climate scientists in the Intergovernmental Panel on Climate Change is that, as the Earth warms, the absorption of carbon dioxide by vegetation — known as carbon sink — is reduced.

Dr Keeling said that since there was no sign of a dramatic increase in the amount of fossil fuels being burnt in 2002 and 2003, the rise "could be a weakening of the Earth's carbon sinks, associated with the world warming, as part of a climate change feedback mechanism. It is a cause for concern."

Tom Burke, visiting professor at Imperial College London, who was

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once an adviser to the former Conservative environment minister John Gummer, warned: "We're watching the clock and the clock is beginning to tick faster, like it seems to before a bomb goes off."

Peter Cox, head of the Carbon Cycle Group at the Met Office's Hadley Centre for Climate Change, said the increase in carbon dioxide was not uniform across the globe.

Measurements of CO₂ levels in Australia and at the south pole were slightly lower, he said, so it looked as though something unusual had occurred in the northern hemisphere.

"My guess is that there were extra forest fires in the northern hemisphere, and particularly a very hot summer in Europe," Dr Cox said. "This led to a die-back in vegetation and an increase in release of carbon from the soil, rather than more growing plants taking carbon out of the atmosphere, which is usually the case in summer."

Scientists have dubbed the two-year CO₂ rise the Mauna Loa anomaly. Dr Cox said one of its most interesting aspects was that the CO₂ rises did not take place in El Niño years. Previously the only figures that climbed higher than 2ppm were El Niño years — 1973, 1988, 1994 and 1998.

The heatwave of last year that is now believed to have claimed at least 30,000 lives across the world was so out of the ordinary that many

scientists believe it could only have been caused by global warming.

But Dr Cox, like other scientists, is concerned that too much might be read into two years' figures. "Five or six years on the trot would be very difficult to explain," he said.

Dr Piers Forster, senior research fellow of the University of Reading's department of meteorology, said: "If this is a rate change, of course it will be very significant. It will be of enormous concern, because it will imply that all our global warming predictions for the next hundred years or so will have to be redone."

David J Hofmann of the US National Oceanic and Atmospheric Administration centre, which also studies CO₂, was more cautious.

"I don't think an increase of 2ppm for two years in a row is highly significant — there are climatic perturbations that can make this occur," he said. "But the absence of a known climatic event does make these years unusual."

"Based on those two years alone I would say it was too soon to say that a new trend has been established, but it warrants close scrutiny."

Links

mlo.noaa.gov
Mauna Loa Observatory
www.metoffice.com/research/hadleycentre/models/carbon_cycle
Hadley Centre: the carbon cycle
guardian.co.uk/climatechange



'A Nobel prize is something I never dreamt of'
Wangari Maathai
News 3

'Milosevic was very upset when he heard about the massacres'
News 5

'Al-Sadr deserves the right to publish a political newspaper'
Naomi Klein
Comment 13

'Bush uses 9/11 to scare people into letting him to do whatever he likes'
REM's Mike Mills
Review front 15

'Does Donald Trump have the lowest forehead outside the primeval forest?'
Culture 22

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