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Researchers show major increase in CO2 emissions

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A rise in atmospheric CO2 emissions continues to outstrip the ability of the world's natural 'sinks' to absorb carbon, according to academics from the University of Sheffield, who have proved this using the strongest evidence to date.

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The discovery, which has been published in the journal *Nature Geoscience*, has been made by an international team of researchers, including Dr Mark Lomas and Professor Ian Woodward from the University's Department of Animal and Plant Sciences, who have collaborated under the umbrella of the Global Carbon Project.

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The team has reported that over the last 50 years, the average fraction of global CO2 emissions that remained in the atmosphere each year was around 43 per cent, while the rest was absorbed by the Earth's carbon sinks on land and in the oceans. However, during this time, this fraction has risen to 45 per cent. This indicates that the carbon sinks have not kept pace with the rapidly increasing emissions, because of responses to climatic change and variability.

[Meet the team](#)

The team shows a 29 per cent increase in global CO2 emissions from fossil fuel between 2000 and 2008 and despite the global economic downturn, emissions increased by 2 per cent during 2008. Because CO2 emissions are closely linked to the Gross Domestic Product (GDP), a small downturn in emissions is expected for 2009, but with an expected increase as the global economy recovers. Coal is now being used more frequently as a fuel compared to oil and developing countries emit more greenhouse gases than developed countries - with a quarter of their growth in emissions accounted for by increased trade with the West.

The researchers are now calling for more research to be conducted into the land and ocean CO2 sinks, in a bid to independently monitor global action to control climate change. The sinks have a major influence on climate change and are important in understanding the link between anthropogenic CO2 emissions and atmospheric CO2 concentration. But so far scientists have not been able to calculate the CO2 uptake of the sinks with sufficient accuracy to explain all the annual changes in atmospheric CO2 concentration, which hinders the scientists' ability to monitor the effectiveness of CO2 mitigations policies.

Professor Ian Woodward said: "Although the land carbon sink has been gradually increasing over the last 50 years, it is very sensitive to changes in climate year by year. We expect that this inter-annual variability will increase in the future and contribute, along with global warming, to a decline in the strength of this natural sink. This decline in efficiency will inevitably lead to an increase in the CO2 emissions that remain in the atmosphere".

Lead author Prof Corinne Le Quéré of the University of East Anglia (UEA) and the British Antarctic Survey said: "The only way to control climate change is through a drastic reduction in global CO2 emissions. The Earth's carbon sinks are complex and there are some gaps in our understanding, particularly in our ability to link human-induced CO2 emissions to atmospheric CO2 concentrations on a year-to-year basis. But, if we can reduce the uncertainty about the carbon sinks, our data could be used to verify the effectiveness of climate mitigations policies."

Notes for Editors: The Global Carbon Project (GCP) was established in 2001 in recognition of the scientific challenge and fundamentally critical nature of the carbon cycle for Earth sustainability. The scientific goal of the project is to develop a complete picture of the global carbon cycle, including both its biophysical and human dimensions together with the interactions and feedbacks between them.

For more information, visit the Global Carbon Project website at the link below.

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