

Scientific debate sparked over carbon sink data

November 18 2009

(PhysOrg.com) -- According to [research published this week](#) in *Nature Geoscience*, emissions of carbon dioxide continue to outstrip the ability of the world's natural 'sinks' to absorb carbon.

The new report follows another study [published only ten days earlier](#) by Dr Wolfgang Knorr in *Geophysical Research Letters*, which concludes that a decline in the capacity of terrestrial ecosystems and the oceans to absorb CO₂ cannot be detected within the available data.

Both studies involved researchers from the University of Bristol's QUEST programme on climate change and [earth system](#) modelling.

About two thirds of the carbon dioxide we emit into the atmosphere is taken up by natural sinks on land and in the [ocean](#). An important issue for [policymakers](#) in Copenhagen next month will be whether or not the ability of these natural sinks to absorb emissions is declining.

The *Nature Geoscience* team, under the umbrella of the Global Carbon Project, found that over the past 50 years the average fraction of global CO₂ emissions that remained in the atmosphere each year has likely increased from 40 per cent to 45 per cent, suggesting a decrease in the efficiency of the natural sinks such as the oceans and terrestrial ecosystems. The team brings evidence that the sinks are responding to climate change and variability.

Dr Wolfgang Knorr's study on the other hand found no increase in the

airborne fraction during the past 50 years and that the trend was in fact negative at $-0.2 \pm 1.7\%$ per decade, which is essentially zero. He therefore concluded that the capacity of terrestrial ecosystems and the oceans to absorb CO₂ has not diminished.

Both studies are based on [atmospheric composition](#) data and statistical data on energy use and land use change, but differ in the way they calculate the trend, how they treat uncertainties in atmospheric concentrations, and how they account for confounding climatic variability.

Knorr explains: “Our apparently conflicting results demonstrate what doing cutting-edge science is really like and just how difficult it is to accurately quantify such data. We are just at the very edge of being able to detect a trend in the airborne fraction.

“The team of QUEST researchers at the University of Bristol are working closely together, and with other researchers in the field, to provide the most up-to-date results possible.”

Dr Jo House of Bristol University and an author on the *Nature Geoscience* paper says, “It is difficult to accurately estimate sources and sinks of CO₂, particularly in emissions from land use change where data on the area and nature of deforestation is poor, and in modelled estimates of the land sink which is strongly affected by inter-annual climate variability.

“While the science has advanced rapidly, there are still gaps in our understanding.”

Despite the knowledge gaps, all authors are in agreement that the only way to control [climate change](#) is through a drastic reduction in global CO₂ emissions.

More information:

- 1) Trends in the sources and sinks of [carbon dioxide](#) by Corinne Le Quéré et al is published online by *Nature Geoscience* on Tuesday November 17 2009.
- 2) Is the airborne fraction of anthropogenic CO₂ emissions increasing? by Wolfgang Knorr was published online by [Geophysical Research Letters](#) on Saturday November 7 2009.

Provided by University of Bristol ([news](#) : [web](#))

Citation: Scientific debate sparked over carbon sink data (2009, November 18) retrieved 19 April 2024 from <https://phys.org/news/2009-11-scientific-debate-carbon.html>

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