

Ocean carbon uptake widely underestimated

Date: September 4, 2020

Source: University of Exeter

Summary: The world's oceans soak up more carbon than most scientific models suggest, according to new research.

FULL STORY

The world's oceans soak up more carbon than most scientific models suggest, according to new research.

Previous estimates of the movement of carbon (known as "flux") between the atmosphere and oceans have not accounted for temperature differences at the water's surface and a few metres below.

The new study, led by the University of Exeter, includes this -- and finds significantly higher net flux of carbon into the oceans.

It calculates CO₂ fluxes from 1992 to 2018, finding up to twice as much net flux in certain times and locations, compared to uncorrected models.

"Half of the carbon dioxide we emit doesn't stay in the atmosphere but is taken up by the oceans and land vegetation 'sinks'," said Professor Andrew Watson, of Exeter's Global Systems Institute.

"Researchers have assembled a large database of near-surface carbon dioxide measurements -- the "Surface Ocean Carbon Atlas" (<http://www.socat.info>) -- that can be used to calculate the flux of CO₂ from the atmosphere into the ocean.

"Previous studies that have done this have, however, ignored small temperature differences between the surface of the ocean and the depth of a few metres where the measurements are made.

"Those differences are important because carbon dioxide solubility depends very strongly on temperature.

"We used satellite data to correct for these temperature differences, and when we do that it makes a big difference -- we get a substantially larger flux going into the ocean.

"The difference in ocean uptake we calculate amounts to about 10 per cent of global fossil fuel emissions."

Dr Jamie Shutler, of the Centre for Geography and Environmental Science on Exeter's Penryn Campus in Cornwall, added: "Our revised estimate agrees much better than previously with an independent method of calculating how much carbon dioxide is being taken up by the ocean.

"That method makes use of a global ocean survey by research ships over decades, to calculate how the inventory of carbon in the ocean has increased.

"These two 'big data' estimates of the ocean sink for CO₂ now agree pretty well, which gives us added confidence in them."

Story Source:

Materials provided by **University of Exeter**. *Note: Content may be edited for style and length.*

Journal Reference:

1. Andrew J. Watson, Ute Schuster, Jamie D. Shutler, Thomas Holding, Ian G. C. Ashton, Peter Landschützer, David K. Woolf, Lonneke Goddijn-Murphy. **Revised estimates of ocean-atmosphere CO₂ flux are consistent with ocean carbon inventory**. *Nature Communications*, 2020; 11 (1) DOI: 10.1038/s41467-020-18203-3
-

Cite This Page:

MLA

APA

Chicago

University of Exeter. "Ocean carbon uptake widely underestimated." ScienceDaily. ScienceDaily, 4 September 2020. <www.sciencedaily.com/releases/2020/09/200904090312.htm>.

RELATED STORIES**Rivers Help Lock Carbon from Fires Into Oceans for Thousands of Years**

June 3, 2020 — The extent to which rivers transport burned carbon to oceans - where it can be stored for tens of millennia - is revealed in new research. The study calculates how much burned carbon is being flushed ...

Could Dark Carbon Be Hiding the True Scale of Ocean 'Dead Zones'?

Dec. 10, 2019 — The impact of climate change on the world's oceans is becoming increasingly known but new research suggests current computer models could be omitting a crucial piece of evidence when it comes to ...

As Oceans Warm, Microbes Could Pump More Carbon Dioxide Back Into Air, Study Warns

Apr. 29, 2019 — A new study suggests that carbon dioxide regeneration may become faster in many regions of the world as the oceans warm with changing climate. This, in turn, may reduce the deep oceans' ability to ...

Calculating the Role of Lakes in Global Warming

Sep. 7, 2016 — As global temperatures rise, how will lake ecosystems respond? As they warm, will lakes -- which make up only 3 percent of the landscape, but bury more carbon than the world's oceans combined -- ...