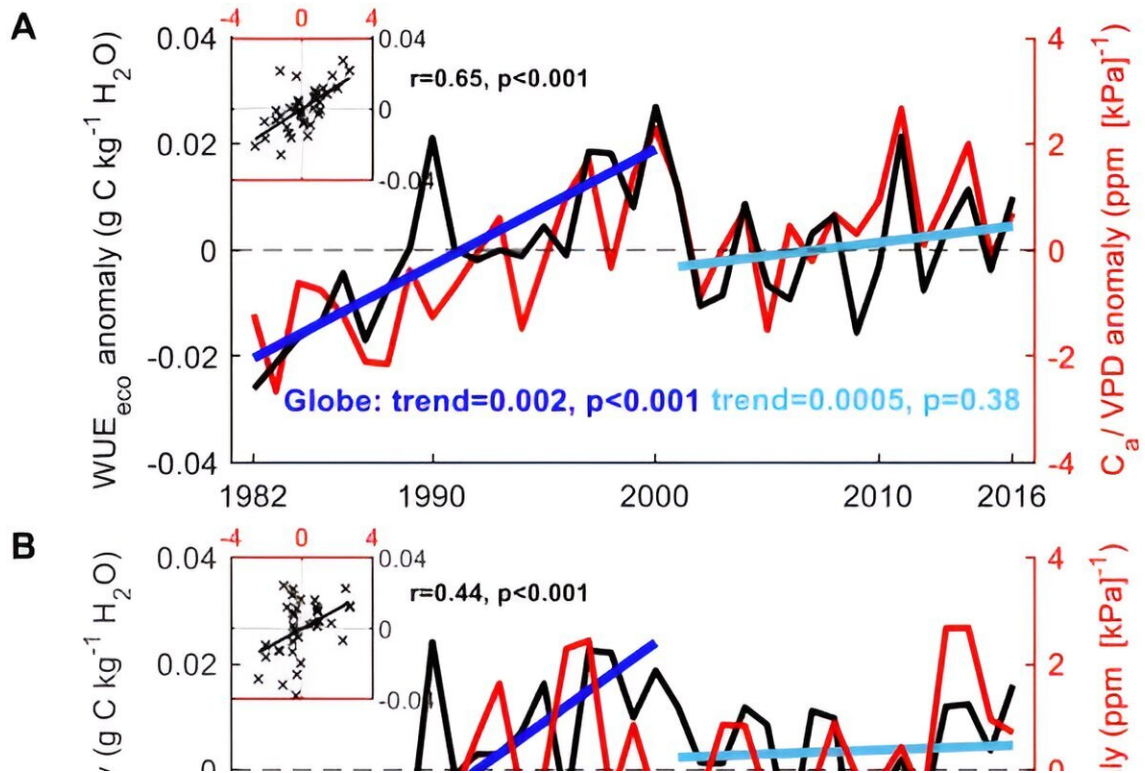


Study suggests rise in global photosynthesis rate due to increase in carbon dioxide has slowed

August 11 2023, by Bob Yirka



Trends in WUE_{eco} and changes in driving factor $[C_a/VPD]$, as well as their statistical correlations over the different regions during the periods 1982–2000 and 2001–2016. (A) the globe, (B) the Northern Hemisphere (NH), and (C) the Southern Hemisphere (SH). Credit: *Science* (2023). DOI: 10.1126/science.adf5041

A team of Earth scientists at the Chinese Academy of Agricultural Science's Grassland Research Institute, working with colleagues from several institutions in the U.S., has found evidence that the rise in photosynthesis rates around the world caused by the increase of carbon dioxide, has slowed dramatically. In their research, reported in the journal *Science*, the group measured changes in global photosynthesis rates over the past several decades.

During photosynthesis, [plants](#) convert CO₂ and water into carbohydrates and release oxygen, therefore they are considered to be [carbon](#) sinks. Prior research has shown that as levels of carbon dioxide in the atmosphere rose over the past century, plants have taken advantage of the increase in the gas by speeding up photosynthesis and have been taking more carbon out of the atmosphere.

The net effect has been a brake on [global warming](#). In this new effort, the research team found evidence that rising atmospheric CO₂ has slowed the rate of increase in global photosynthesis because the atmosphere has also grown drier.

To learn more about the global rate of photosynthesis, the researchers studied data collected by ground monitors around the world during the years 1982 to 2016. Such monitors collect environmental statistics, such as the amounts of CO₂ and water in the air.

The team also collected satellite images of regions covered by foliage. They then trained multiple machine-learning applications with the images to find difficult-to-see changes, such as colors of leaves, that reveal rates of photosynthesis.

Next, the team created models with the resulting data to graphically illustrate changes in global synthesis rates from the year 2000 to the present. They then used the models to predict future changes.

The researchers found that as CO₂ levels rose over the last century, global rates of photosynthesis rose along with them accordingly. But starting in the year 2000, things changed. The rise of [photosynthesis](#) rates began to slow, and they may stop rising altogether in the near future as the planet grows warmer and drier.

More information: Fei Li et al, Global water use efficiency saturation due to increased vapor pressure deficit, *Science* (2023). [DOI: 10.1126/science.adf5041](#)

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