

Sensitivity of carbon cycle to tropical temperature variations has doubled

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The tropical carbon cycle has become twice as sensitive to temperature variations over the past 50 years, new research has revealed.

The research shows that a one degree rise in tropical temperature leads to around two billion extra tonnes of carbon being released per year into the atmosphere from tropical ecosystems, compared with the same tropical warming in the 1960s and 1970s.

Professor Pierre Friedlingstein and Professor Peter Cox, from the University of Exeter, collaborated with an international team of researchers from China, Germany, France and the USA, to produce the new study, which is published in the leading academic journal *Nature*.

Existing Earth System Model simulations indicate that the ability of tropical land ecosystems to store carbon will decline over the 21st century. However, these models are unable to capture the increase in the sensitivity of carbon dioxide to [tropical temperatures](#) that is reported in this new study.

Research published last year by Professors Cox and Friedlingstein showed that these variations in [atmospheric carbon dioxide](#) can reveal the sensitivity of tropical ecosystems to future climate change.

Taken together, these studies suggest that the sensitivity of tropical ecosystems to climate change has increased substantially in recent decades.

Professor Cox, from the College of Engineering, Mathematics and Physical Sciences said "The year-to-year variation in [carbon dioxide concentration](#) is a very useful way to monitor how tropical ecosystems are responding to climate.

"The increase in [carbon dioxide](#) variability in the last few decades suggests that tropical ecosystems have become more vulnerable to warming".

Professor Friedlingstein, who is an expert in [global carbon cycle](#) studies added: "Current land carbon cycle models do not show this increase over the last 50 years, perhaps because these models underestimate emerging drought effects on [tropical ecosystems](#)".

The lead author of the study, Xuhui Wang of Peking University, added: "This enhancement is very unlikely to have resulted from chance, and may provide a new perspective on a possible shift in the terrestrial carbon cycle over the past five decades".

More information: A two-fold increase of carbon cycle sensitivity to tropical temperature variations, [DOI: 10.1038/nature12915](https://doi.org/10.1038/nature12915)

Provided by University of Exeter

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