

International collaboration reveals China's carbon balance

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Southwest China is populated by fast-growing and high-yielding tree species with high potential biomass carbon sequestration. Credit: Yaogao Huang

An international team of researchers has compiled and verified newly available data on the country's CO₂ sink, and, for the first time, they have quantitatively estimated the effect of China's carbon mitigation efforts.

The researchers published their results on October 28 in *Nature*.

"China is currently one of the world's major emitters of CO₂, but China's forest resources have been growing continuously for the past 30 years," said paper author Yi Liu, professor with the Institute of Atmospheric Physics at the Chinese Academy of Sciences. "In this study, we achieve a better understanding of CO₂ fluxes over China."

Previously, the CO₂ monitoring stations on the ground over China were few and far between, resulting in CO₂ flux estimates with large uncertainties. One monitoring station could represent a significant area that included distinctly different land use types. The lack of data resulted in fewer studies on CO₂ in China, as well.

"Therein lies the crux of the challenge faced by science and policy communities: effective mitigation of fossil fuel CO₂ emissions within a large-scale dynamic natural carbon cycle that we do not quantitatively understand," Liu said.

"Without good data, it was nearly impossible to assess how China's forestry efforts to mitigate CO₂ emissions were actually faring," added Jing Wang, lead author of the study from the same institute.

That changed when the China Meteorological Administration started collecting weekly and hourly continuous atmospheric CO₂ measurements between 2009 and 2016 available.

Liu and his team found that, between 2010 and 2016, China reabsorbed about 45% of the country's estimated annual human-made CO₂ emissions.

They corroborated that data with independent satellite remote-sensing measurements of vegetation greenness, soil water availability, satellite

column observations of CO₂ and forest censuses.

"While our results still have large uncertainties, it's clear that China's forest ecosystem has a huge carbon sequestration effect," said paper author Paul I. Palmer from the School of GeoSciences at the University of Edinburgh in the UK.

The researchers plan to fine tune their results with more ground and [satellite data](#), with the ultimate goal of improving their calculation methods to be able to determine the carbon budget of smaller areas, such as cities.

More information: Large Chinese land carbon sink estimated from atmospheric carbon dioxide data, *Nature* (2020). [DOI: 10.1038/s41586-020-2849-9](#), www.nature.com/articles/s41586-020-2849-9

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