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# Press Release

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## Forests capture nearly half of China's $CO_2$ emissions, study finds

China's vegetation reabsorbs almost half of the country's estimated annual carbon dioxide emissions, a much higher proportion than previously thought, a study says.

An international team of scientists estimate that China's carbon dioxide ($CO_2$) sink – the land's ability to absorb $CO_2$ from the atmosphere – recaptured about 45 per cent of the country's emissions between 2010 and 2016.

The seven-year study, led by the University of Edinburgh and the Chinese Academy of Sciences also provides a better understanding of China's $CO_2$ fluxes – the changing amount of carbon exchanged between the atmosphere and the land.

Limiting the rise in mean global temperatures relies on reducing emissions and removing $CO_2$ by land sinks, which include forests, vegetation and shrubs.

Researchers analysed ground-based and satellite data from six sites across the country to calculate the size and location of seasonal $CO_2$ fluxes.

Previously, $CO_2$ monitoring stations across China were few and far between. Experts say this led to large uncertainties in $CO_2$ flux estimates and hindered assessment of China's efforts to mitigate carbon emissions through afforestation.

This changed when the Chinese Meteorological Administration started collecting frequent measurements of atmospheric $CO_2$.

The new data, published in *Nature*, revealed a larger than expected $CO_2$ land sink in Yunnan, Guizhou and Guangxi provinces in southwest China, that operates all year around. The team also found a large seasonal carbon sink in northeast China, particularly in Heilongjiang and Jilin provinces, that absorbs carbon during the growing season and naturally releases carbon during the remainder of the year.

In the past 10 to 15 years, the provinces have increased provincial forest areas by between 0.04 million and 0.39 million hectares per year. Satellite observations of vegetation greenness show a large increase over the study period, coinciding with the increase in the $CO_2$ sink over regions of afforestation.

Study lead Professor Paul Palmer, of the University of Edinburgh's School of GeoSciences, said: "Bold scientific statements must be supported by massive amounts of evidence and this is what we have done in this study. We have collected together a range of ground-based and satellite data-driven evidence to form a consistent and robust narrative about the Chinese carbon cycle."

Jing Wang, a visiting PhD student at the University of Edinburgh at the time of the study, based at the Institute of Atmospheric Physics in the Chinese Academy of Sciences, Beijing, China, said: "China is one of the major global emitters of $CO_2$ but how much is absorbed by its forests is very uncertain. Working with $CO_2$ data collected by the Chinese Meteorological Administration we have been able to locate and quantify how much $CO_2$ is absorbed by Chinese forests."

Professor Yi Liu, of the Institute of Atmospheric Physics at the Chinese Academy of Sciences, Beijing, China, said: “Achieving China’s net-zero target by 2060, recently announced by the Chinese President Xi Jinping, will involve a massive change in energy production and also the growth of sustainable land carbon sinks. The afforestation activities described in this paper will play a role in achieving that target.”

The researchers plan to refine the results with more ground and satellite data to improve estimates of $CO_2$ fluxes and focus on smaller areas, such as cities.

The work was supported in part by the UK Natural Environmental Research Council National Centre for Earth Observation, the Chinese Academy of Sciences, the European Space Agency, the Royal Society of London, the National Key Research and Development Program of China and the NASA Jet Propulsion Laboratory.

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