

# New Estimates of Carbon Pools in China's Terrestrial Ecosystems

China's terrestrial ecosystems have functioned as important carbon sinks. Although there have been several studies on the carbon pools of China's terrestrial ecosystems, large uncertainties remain due to the limitations of sample size, multiple data sources, and inconsistent methodologies.

A research group led by FANG Jingyun at the Institute of Botany, Chinese Academy of Sciences has been studying the carbon pool/sink of China's terrestrial ecosystems for a long time. Recently, the group worked with ZHOU Guoyi from the South China Botanical Garden, Chinese Academy of Sciences in Wuhan to conduct an intensive field survey and investigate all sectors of carbon stocks in China's forests, shrublands, grasslands, and croplands. The survey aimed to better estimate regional and national carbon pools and to explore the biogeographical patterns and potential drivers of these pools.

Results showed that the total carbon pool in these four ecosystems was  $79.24 \pm 2.42$  Pg C, of which 82.9% was stored in soil (to a depth of 1 m), 16.5% in biomass, and 0.60% in litter. Forests, shrublands, grasslands and croplands contained  $30.83 \pm 1.57$  Pg C,  $6.69 \pm 0.32$  Pg C,  $25.40 \pm 1.49$  Pg C, and  $16.32 \pm 0.41$  Pg C, respectively.

If all terrestrial ecosystems are taken into account, the country's total carbon pool is  $89.27 \pm 1.05$  Pg C.

The study renewed the estimates of carbon pools in China's terrestrial ecosystems based on direct field

measurements, and these estimates are essential to the validation and parameterization of carbon models in China and globally.

The carbon density of the forests, shrublands, and grasslands exhibited a strong correlation with climate: it decreased with temperature but increased with precipitation.

The country's forests have a large potential of biomass carbon sequestration of 1.9–3.4 Pg C in the next ten to 20 years assuming no removals, the study suggested.

These findings provided a benchmark to identify the effectiveness of the government's natural protection policies.

As one of the seven papers appearing in a special feature entitled "Climate change, human impacts, and carbon sequestration in China" in the *Proceedings of the National Academy of Sciences of the United States of America*, their paper was published under the title of "Carbon pools in China's terrestrial ecosystems: new estimates based on an intensive field survey" on April 18, 2018.

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