



CONCERTO Graphical Summary

A global database of net primary production of **terrestrial ecosystems**

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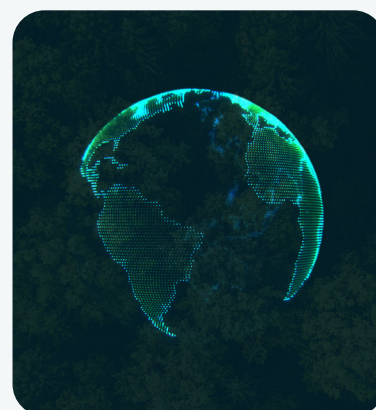
Background

Understanding how terrestrial ecosystems take up and store carbon is essential for tackling climate change. A key measure of this is net primary production (NPP), the amount of carbon plants capture from the atmosphere and turn into biomass as they grow. However, existing data on NPP are often scattered, inconsistent, and difficult to compare across regions. This limits our ability to fully understand how ecosystems function and respond to environmental change. To address this, the study develops a new harmonised global database that brings together different types of NPP data into one consistent framework.



Objective

The study aims to improve how we assess and compare plant productivity across the globe. Moreover, creating a comprehensive and standardised database of NPP helps scientists and policymakers better assess how ecosystems store carbon and how this may be altered by climate change. This contributes to more reliable climate models and better-informed environmental decisions.



Results

The study delivers a global database compiling NPP data from hundreds of sites worldwide, covering both aboveground (e.g. leaves, stems) and belowground (e.g. roots) plant growth. The results show strong differences in productivity across ecosystems and reduce inconsistencies between existing datasets. These findings underline the importance of harmonising data and comparing measurement approaches. The database provides a valuable benchmark for evaluating and improving ecosystem and climate models, especially in representing carbon dynamics.



Stakeholders



**Climate scientists
and researchers**



**Environmental policymakers
and EU institutions**



**Land managers and
conservation organisations**



**Climate model
developers**

Key messages



A unified global database of NPP crucially helps us **in improving our understanding** of how much carbon terrestrial ecosystems accumulate.

Significant differences between datasets highlight **the need for better standardisation**.

Reliable NPP data are essential for **improving climate models and carbon cycle assessments**.

Better data supports **more informed decisions** in climate policy and land management.



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Practical value

The database offers a practical tool for assessing ecosystem productivity and carbon accumulation more consistently across the globe. It can be directly used to improve climate models, support carbon accounting, and guide land-use and climate mitigation strategies. By reducing uncertainty and enabling better comparisons, it strengthens the scientific basis for decision-making in environmental policy and management.



<https://www.nature.com/articles/s41597-025-05773-4>



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