



News Release

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Maps of forests, fields and soils to aid climate change forecasts

Detailed maps of the world's natural landscapes could help scientists to better predict the impacts of future climate change.

The complex charts of forests, grasslands and other productive ecosystems provide the most complete picture yet of how carbon from the atmosphere is reused and recycled by Earth's natural habitats.

Although it is well known that these landscapes absorb and process massive amounts of carbon dioxide, little is known about where exactly the carbon is stored or how long it remains there.

Using satellite images and field study data covering a 10-year period from 2000 to 2010, researchers have constructed maps that show where – and for how long – carbon is stored in plants, trees and soils.

The team, led by scientists at the University of Edinburgh, say understanding how carbon is stored will allow researchers to more accurately predict the impacts of climate change.

The maps reveal that the biological properties of leaves, roots and wood in different natural habitats affect their ability to store carbon, and show that some ecosystems retain carbon for longer than others.

Large swathes of the dry tropics store carbon for a relatively short time owing to frequent fires – while in warm, wet climates carbon is stored for longer in plants than in soils.

To build the maps, researchers used a computer model to analyse huge amounts of satellite and field data. To generate values for each of the 13,000 cells on each map, a supercomputer at the Edinburgh Compute and Data Facility ran the model approximately 1.6 trillion times.

New data can be added to the maps as it becomes available. The impact that major events – such as forest fires – have on ecosystems' ability to store carbon can be determined within three months of them occurring, researchers say.

The study, published in the journal *Proceedings of the National Academy of Sciences*, was funded by the Natural Environment Research Council. The research was carried out in collaboration with Wageningen University, and part of the work took place at NASA's Jet Propulsion Laboratory, managed by the California Institute of Technology.

Professor Mathew Williams, of the University of Edinburgh's School of GeoSciences, who led the study, said: "Recent studies have highlighted the disagreement among Earth system models in the way they represent the current global carbon cycle. Our results constitute a useful, modern, benchmark to help improve these models and the robustness of global climate projections."

For further information, please contact:

Corin Campbell, Press & PR Office, tel 0131 650 6382, email Corin.Campbell@ed.ac.uk

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