

Landmark carbon assessment developed for Australia

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Terrestrial Ecosystem Research Network facilities such as this Tumbarumba tower provide access to comprehensive, high-quality datasets for the national carbon assessment.

The Australian landscape soaked up one third of the carbon emitted by fossil fuels in Australia over the past twenty years, according to a new CSIRO study released last week.

The study, which marks a significant milestone in Australian

[atmospheric science](#), also found that Australia exported 2.5 times more carbon in fossil fuels in 2009-2010 than was emitted from fossil fuels burned within Australia.

These results emerge from the three-year study, the Australian Terrestrial [Carbon Budget](#), published this month in the journal *Biogeosciences*.

In the study, scientists quantified how much land carbon is lost or gained through plant and soil 'breathing' in response to variable climate and rising carbon dioxide. Effects of fires, erosion and deforestation were also considered. All these processes together with [fossil fuel emissions](#) are critical to domestic [carbon management](#) and international reporting protocols.

The project centres on the variability of carbon flows for the past two decades, and how this period compares with the past 100 years.

Lead author, Dr Vanessa Haverd said the increase in plant production through carbon dioxide fertilisation is larger in the warmer regions of the continent. "For Australia as a whole, increased carbon dioxide has caused a 15 per cent increase in plant production over the last two decades, relative to pre-industrial times," she said.

Dr Haverd said study data will help the understanding of how carbon stored in the Australian landscape responds to [climate variability](#) – the swings between drought and flood.

"It is important to know that carbon stored in the land during periods of high plant growth may disappear again during the next drought," Dr Haverd said.

"Understanding any trends and changes in fire regime or intensity,

particularly in the savanna fires of [Northern Australia](#), is important for quantifying the impact of fire on the net [carbon balance](#)," she said.

Other results include:

- On average 2.2 billion tonnes of carbon is taken up by plants per year (1990-2011).
- Across Australia, grassy vegetation (dominant in dry and savanna regions) accounts for 56% of carbon uptake while woody vegetation accounts for 44% .
- In wet (high-growth) years, the Australian biosphere 'breathes in' a vast amount of carbon from the atmosphere, exceeding the total of human-induced greenhouse gas emissions, while in dry years, the biosphere 'breathes out' a nearly equal amount of carbon back to the atmosphere – this variability is associated with Australia's highly variable climate; and
- Carbon uptake from 1990-2011 was high compared with the rest of the twentieth century due largely to carbon dioxide fertilisation.

The study is one of 14 regional and continental studies around the world, as part of the Regional Carbon Cycle Assessment and Processes (RECCAP).

More information: [The Australian terrestrial carbon budget](#) (abstract) in *Biogeosciences*.

Provided by CSIRO

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