

Savannahs slow climate change

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Tropical rainforests have long been considered the Earth's lungs, sequestering large amounts of carbon dioxide from the atmosphere and thereby slowing down the increasing greenhouse effect and associated human-made climate change. Scientists in a global research project now show that the vast extensions of semi-arid landscapes occupying the transition zone between rainforest and desert dominate the ongoing increase in carbon sequestration by ecosystems globally, as well as large fluctuations between wet and dry years. This is a major rearrangement of planetary functions.

An international study released this week, led by Anders Ahlström, researcher at Lund University and Stanford University, shows that semi-arid ecosystems—savannahs and shrublands—play an extremely important role in controlling carbon sinks and the climate-mitigating ecosystem service they represent.

"Understanding the processes responsible for trends and variability of the carbon cycle, and where they occur, provides insight into the future evolution of the carbon sink in a warmer world and the vital role natural ecosystems may play in accelerating or slowing down human-induced [climate change](#)", says Anders Ahlström.

Tropical rainforests are highly productive, and this means that they take up a lot of carbon dioxide, but rainforests are crowded places with little room to fit in more plants to do more photosynthesis and to store carbon. In addition, the typical moist, hot weather conditions are ideal for growth and do not change much from year to year.

In savannahs it is different. As productivity increases there is room to fit in more trees whose growing biomass provides a sink, or store, for carbon sequestered from the atmosphere. In addition, savannahs spring to life in wetter years, causing large fluctuations in carbon dioxide uptake between wet and dry years. Large enough, Ahlström and colleagues show, to control the amount of carbon dioxide in the atmosphere.

"There has been an increase in the uptake of carbon dioxide over time, and land ecosystems have together absorbed almost one third of all [carbon dioxide](#) emissions from human activity since the 1960s. What is perhaps even more surprising is that this trend is also dominated by the semi-arid lands", Anders Ahlström says.

We have long known that we need to protect the rainforests but, with this study, the researchers show that a heightened effort is needed to manage and protect the semi-arid regions of the world as well.

"The world's semi-arid regions will become even more important in the future as climate variability and extremes increase in a warmer world", says the Australia-based researcher Josep G Canadell, director of the Global Carbon Project. "The extensive semi-arid regions of the world are emerging as a growing force in shaping the functioning of our planet", he continues.

"This study brings out clearly the importance of directing attention towards savannahs and other dry-climate ecosystems that have been largely neglected so far in climate policy discussions, and that moreover characterize the landscapes of some of the poorer countries of the Earth", says Benjamin Smith, Professor of Ecosystem Science at Lund University.

Provided by Lund University

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