Amazon floodplain trees emit as much methane as all Earth's oceans combined

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Uncontacted indigenous tribe in the brazilian state of Acre. Credit: Gleilson Miranda / Governo do Acre / Wikipedia

Environmental scientists from The Open University (OU) have discovered that trees growing in the Amazon floodplains surrounding the

Amazon River emit as much methane (CH_4) into the atmosphere as all of the world's oceans. These trees growing in seasonal wetland areas of the Amazon contribute between 15.1 and 21.2 million tonnes of CH_4 to the atmosphere every year, comparable to 18 million tonnes from the oceans, or 16 – 27 million tonnes from Arctic tundra wetlands.

Conducted in collaboration with academics from the University Federal of Rio de Janeiro, the Universities of Leeds, Linköping, British Columbia, and other partners, the research measured the gas emissions from the trunks of over 2,300 Amazonian floodplain trees. It found that the trees, which act as chimneys, funnelling the methane produced in the soil, are the source of the largest diffusive emissions ever recorded in wetlands.

Co-author of the paper and a lead investigator of the research is Professor of Global Change Ecology, Vincent Gauci; he said:

"Methane is around 34 times more powerful than carbon dioxide at trapping heat in the atmosphere so it is really important to understand where this gas comes from in both natural ecosystems and from human activity.

"Great swathes of the Amazon become flooded forest for a large part of the year, which are ideal conditions for the production of methane. However, methane emissions measured from the water surface over the last few decades didn't add up to what satellites and models were suggesting was the real amount of methane coming out of the Amazon. We have discovered that large emissions from trees, sometimes flooded by up to 10 meters, fill this gap."

Whilst the process is natural, these emissions could respond to environmental change, such as the programme of dam building across the Amazon basin. However, co-author and Research Fellow at

Lancaster University, Sunitha Pangala, who carried out the research whilst a post-doctoral researcher at the OU, warns that the Amazon floodplains are not the source of greenhouse gases we should be concerned about:

"We are not, in any way, saying that trees are bad for the environment – this is how natural forests function. We now have a fuller picture of the sources of greenhouse gas emissions and this could help to inform how environmental change can have a knock on effect on the tropical wetland methane source.

"Emissions from these Amazon trees are still only half as much as those created by humans in the form of landfill and waste, so we should be targeting reductions in human emissions," continued Pangala. "This also includes the dairy and meat industries, and fossil fuel emissions, such as from fracking."

The research, "Large emissions from floodplain trees close the Amazon methane budget," is published yesterday in the journal *Nature*.

More information: Sunitha R. Pangala et al. Large emissions from floodplain trees close the Amazon methane budget, *Nature* (2017). DOI: 10.1038/nature24639

Provided by The Open University

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