

Rainforest carbon loss: Aerial scans reveal degradation key trigger of Amazon forest emissions

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Scientists discovered that forest disturbances like fires, wind and selective logging are triggering the most carbon loss from at-risk ecosystems, such as tropical rainforests. This photo shows a similar forest under study in Panama. Credit: Jeff Warren/ORNL, U.S. Dept. of Energy, and Joe Wright/Smithsonian Tropical Research Institute.

Scientists using high-resolution aerial scans and computational modeling

concluded that wildfires, storms and selective logging have become key drivers behind rainforest carbon emissions, outpacing clear-cutting practices.

The team used drones equipped with [light detection](#) and ranging sensors, or LiDAR, to measure tree biomass and [carbon emissions](#) in Brazilian forests. Led by NASA's Jet Propulsion Laboratory, the researchers found that of the 90.5 million tonnes per year of carbon lost, about 60 million tonnes came from degradation, while approximately 24 million tonnes were tied to clear-cutting.

KC Cushman, an Oak Ridge National Laboratory scientist focused on studying at-risk ecosystems with [remote sensing](#), provided data analytics expertise to the project. "It's important to calibrate models to local conditions to achieve the best estimates," Cushman said. "Tree shape varies a lot from one setting to another even if it's the same species."

The work is [published](#) in the journal *Proceedings of the National Academy of Sciences*.

Cushman is deploying similar capabilities to study carbon dynamics in forests in the U.S. Southeast and in the tropics.

More information: Ovidiu Csillik et al, A large net carbon loss attributed to anthropogenic and natural disturbances in the Amazon Arc of Deforestation, *Proceedings of the National Academy of Sciences* (2024). [DOI: 10.1073/pnas.2310157121](https://doi.org/10.1073/pnas.2310157121)

Provided by Oak Ridge National Laboratory

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