

Drought, fires impact ability of Amazon to hold carbon dioxide

February 25 2014, by Anne Danahy

Fires in the Amazon could jeopardize the forest's ability to soak up carbon dioxide emissions even as deforestation there slows down, according to a Penn State geographer.

In an invited commentary in the Feb. 6 edition of *Nature*, Jennifer Balch, assistant professor of geography, noted that dry weather conditions, coupled with fires, may mean that over time the Amazon forest will lose its ability to take in more carbon dioxide than it releases—going from being a carbon sink to a source.

"Aircraft have just recently captured the 'breath' of the entire Amazon forest," Balch said. "This is really important work that represents the first time that carbon fluxes from the Amazon basin have been obtained in this way."

Her commentary follows the work of researchers (whose findings are published in that edition of *Nature*) who used aircraft to profile how much carbon the forests are releasing. During drought conditions, the forests took up less of the carbon dioxide that comes with fires. That, coupled with a slowdown in photosynthesis, saw an upswing in [carbon dioxide](#) emissions from the forest dome.

An important next step, Balch wrote, is determining what types of fires—wildfires or those used for agriculture, for example—are behind the large amount of land that is burned every year. That information could help direct fire prevention and management in the future. Since

the year 2000, 85,000 square kilometers of understory forests burned in the Amazon.

During wetter years, the forest was able to offset those emissions, becoming essentially carbon neutral. But that was not the case during the drought year that was studied.

Balch noted that the Amazon forest "has had a substantial role in offsetting" [greenhouse gas emissions](#).

"Whether this annual uptake will persist and compensate for emissions related to drought and land use in the future remains uncertain," she wrote.

If droughts, coupled with fires, continue, the Amazon may lose its ability to be a [carbon sink](#).

Balch's work includes research into the role of fire on Earth's ecosystems, including how fires contribute to climate change and how climate change can affect fire cycles.

Provided by Pennsylvania State University

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