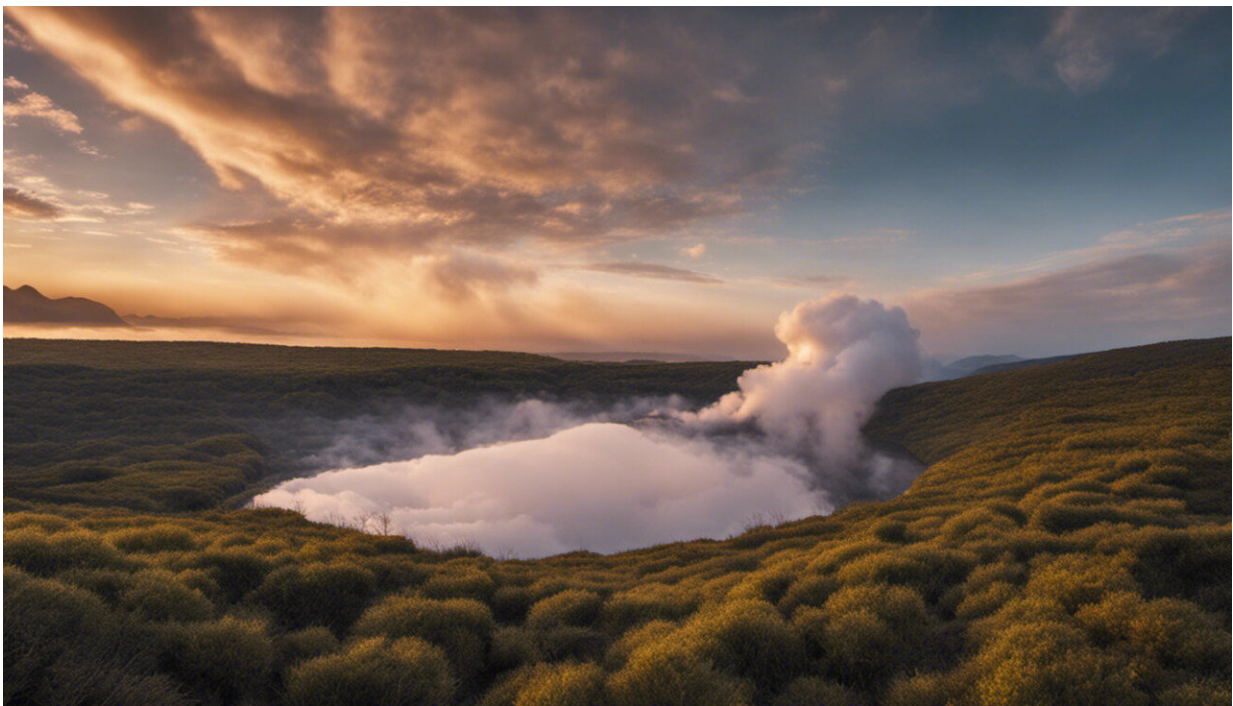


Greenhouse gas emission impact from peatland fires underestimated by 200–300 percent

February 8 2022, by Suzanna Burgelman



Credit: AI-generated image ([disclaimer](#))

Deforestation fires in Brazil and Indonesia accounted for 3 percent and 7 percent, respectively, of the planet's total greenhouse gas emissions (GHG) in 2019 and 2020, finds a new study in *Frontiers in Climate*. Of that amount, fires in peatlands contributed to between 40 percent and 60

percent of the GHG emission impact, showing a severe underrepresentation by previous estimations. The researchers urge better forest and peatland protection policies.

Global forest fires in 2019 and 2020, such as the wildfires in Australia and California, and the [deforestation](#) fires in Brazil and Indonesia, accounted for between 10 percent and 15 percent of global GHG emissions.

In Brazil, a total of 11,088 km² of forest were destroyed from August 2019 to July 2020. In 2019, Indonesia lost 31,000 km² of forest to deforestation fires. Many of these fires burned in carbon-rich [peatland](#) ecosystems.

"The impact that human activities are causing in forests, especially in critical ecosystems like peatlands, is not well communicated to the general audience," explained author Dr. Ramanan Krishnamoorti, of the University of Houston.

"During the 2019 [fire](#) season in Indonesia and Brazil, we observed a wide range of numbers being quoted in scientific and media communications," continued Krishnamoorti. "We wanted to understand the basis of these numbers but ran into challenges accessing the data. That led us to analyze the sources of measurement and errors, how the errors are compounded over time, and their impact on policies."

To do so, Krishnamoorti and his colleague, Dr. Aparajita Datta, quantified the GHG emissions associated with the 2019 and 2020 deforestation fires in Brazil and Indonesia and examined the share of emissions stemming from peatland fires.

From carbon sinks to sources

Covering only 3 percent of the world's landmass, peatlands exist across 180 countries and are the largest terrestrial carbon sink. They store at least twice as much carbon as any other vegetation type, yet 15 percent of the world's known peatlands have been irreversibly damaged or are currently undergoing extreme degradation due to activities that support human development.

When peatlands burn, the stored CO₂ gets released into the atmosphere, together with other GHGs such as carbon monoxide (CO) and methane (CH₄). Peatland fires are characterized by slow burning of surface vegetation and underground smoldering of peat soils over days or weeks. The accompanying smoke plumes contribute to air pollution, affecting wildlife and human health.

Deforestation fires emissions

The researchers used publicly available data for deforestation in Brazil and Indonesia to estimate the total GHG impact of deforestation fires in 2019 and 2020. They accounted for emissions from fires from above-ground biomass, as well as peat soils and dry matter in peatlands. They analyzed available data from all Indonesian provinces, and the Legal Amazon and Pantanal regions in Brazil.

The results show that Brazil and Indonesia collectively emitted nearly 2 gigatons CO₂ equivalents (CO₂e) in 2019 and 1 gigaton CO₂e in 2020 from the burning of above-ground biomass.

When the researchers included the emissions from deforestation fires in peatlands, the combined GHG impact in both countries increased to 3.65 gigatons CO₂e in 2019 and 1.89 gigatons CO₂e in 2020.

Underestimation of peatland fires

As peatland fires primarily burn underground, their detection through satellites is challenging. The thick plumes of smoke further limit the efficacy of satellite monitoring.

The researchers showed that using data based only on real-time satellite measurements gives a partial and skewed estimate of the actual [emission](#) impact of deforestation fires in peatlands, which, in turn, has an impact on climate policies and climate crisis mitigation.

Their results indicate that peat emissions in Brazil and Indonesia accounted for between 40 percent and 60 percent of the GHG impact from deforestation fires in both countries. Comparing the results of the study with previous GHG estimates shows that the prior data is underestimating the true impact of deforestation fires by two- to threefold during severe fire years.

"Monitoring and measurement challenges in peatlands lead to an underestimation of the true impact of deforestation fires. Since these estimates form the basis of the policy response from national governments, it results in inadequate attention to forest and peatland protection as part of climate crisis mitigation efforts," said Krishnamoorti.

The study highlights the need for better mapping of peatland ecosystems and peatland fires, along with regular pre-and post-fire ground measurements to complement satellite measurements.

More information: Aparajita Datta et al, Understanding the Greenhouse Gas Impact of Deforestation Fires in Indonesia and Brazil in 2019 and 2020, *Frontiers in Climate* (2022). [DOI: 10.3389/fclim.2022.799632](https://doi.org/10.3389/fclim.2022.799632)

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