

Study quantifies Saharan dust reaching Amazon

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Credit: University of Miami

A new study by researchers at the University of Miami (UM) Rosenstiel School of Marine and Atmospheric Science and ATMO Guyane quantified the amount of Saharan dust reaching the Amazon to better understand how dust could impact soil fertility in the region. Intense tropical weathering and local biomass burning have both contributed to nutrient-poor soil in the Amazon Basin.

The research team analyzed 15 years of daily measurements of African dust transported in [trade winds](#) and collected at a coastal research station in Cayenne, French Guiana. The results showed that significant quantities of dust reach the heart of the Amazon Basin and are deposited there.

"African dust provides an important source of nutrients to enhance Amazonian soil fertility," said Joseph Prospero, professor emeritus at the UM Rosenstiel School and lead author of the study.

Every year, mineral-rich dust from North Africa's Sahara Desert is lifted into the atmosphere by winds and carried on a 5,000-mile journey across the North Atlantic to the Americas. African dust contains phosphorus and other important plant nutrients that help offset soil losses and increase Amazonian [soil fertility](#).

This study, the first to quantify African dust transport to South America, showed that significant amounts of dust is deposited to the Amazon. The analysis also found that previous studies, which were based on limited measurements of dust, may have greatly overestimated the impact.

The Amazon Basin plays a major role in global climate. Trees and plants in the Amazon remove huge quantities of carbon dioxide from the atmosphere and store the carbon in vegetation. This removal offsets some of the man-made CO₂ emitted into the atmosphere and mitigates the impact of CO₂ on global climate.

The scientists also found that quantities of dust transported to South America are inversely linked to rainfall in North Africa and concluded that [climate change](#) will affect dust transport to South America.

"Changes in dust transport could affect plant growth in the Amazon and the amount of CO₂ drawn from the atmosphere. This, in turn, would

further impact climate," said Prospero. "Our results highlight the need for long-term monitoring to identify changes that might occur to Africa [dust](#) transport from climate change."

The study, titled "Characterizing and Quantifying African Dust Transport and Deposition to South America: Implications for the Phosphorus Budget in the Amazon Basin," was published in the September 2020 issue of the American Geophysical Union's journal *Global Biogeochemical Cycles*.

More information: Joseph M. Prospero et al, Characterizing and quantifying African dust transport and deposition to South America: Implications for the phosphorus budget in the Amazon Basin, *Global Biogeochemical Cycles* (2020). [DOI: 10.1029/2020GB006536](https://doi.org/10.1029/2020GB006536)

Provided by University of Miami

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