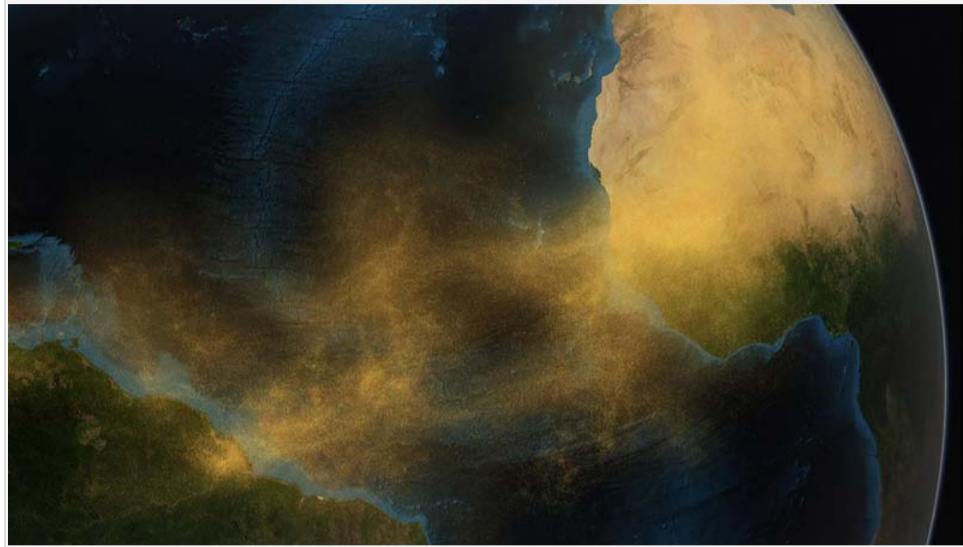


Dust from the Saharan Desert Fertilizes the Amazon Rainforest

Posted on March 2, 2015 [Leave a Comment](#)



This conceptual image depicts dust from the Saharan Desert crossing the Atlantic Ocean to the Amazon rainforest in South America. (Image courtesy of Conceptual Image Lab, NASA/Goddard Space Flight Center)

The Sahara Desert, located in northern Africa, is the world’s largest desert. The Amazon rainforest, located in northern South America, is the world’s largest rainforest. New research, published in the journal *Geophysical Research Letters*, indicates that these ecosystems, while vastly different, are tied together. Each year, nearly 28 million tons of Saharan desert dust is swept across the Atlantic Ocean by strong winds, and deposited in the Amazon.

This transportation of dust is significant because it imports nutrients such as phosphorus into the nutrient-poor soils of the Amazon rainforest. While the Amazon rainforest is lush with green foliage, the majority of the nutrients are stored in the plants, making for few nutrients in the soil. What little soil nutrients remain are washed away by the rainforest’s heavy rains.

According to Dr. Hongbin Yu, an atmospheric scientist at the University of Maryland and lead author of the study, the

phosphorus that reaches the Amazon rainforest— about 22,000 tons per year – is about the same amount that exits the ecosystem through precipitation and flooding. This finding is just a small part of the larger research project to understand the part dust plays in the environment and its impact on climate on both a local and global scale.

“We know that dust is very important in many ways,” Dr. Yu said in a press release about the research. “It is an essential component of the Earth system. Dust will affect climate, and, at the same time, climate change will affect dust.”

Yu and his colleagues used data collected by NASA’s Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observation (CALIPSO) satellite between 2007 and 2013. The researchers concentrated on data concerning the flow of dust from the Sahara across the Atlantic Ocean to South America and further out to the Caribbean Sea. This movement is the largest transportation of dust on the planet.

Data from the satellite show that, on average, 182 million tons of dust is picked up annually and transported past the western edge of the Sahara. This dust is blown 1600 miles across the Atlantic Ocean, and 132 million tons remain in the air when it arrives along the eastern coast of South America. As discussed earlier, 27.7 million tons falls to the Earth’s surface over the Amazon basin. Approximately 43 million tons of dust travels beyond this region and settles out of the atmosphere over the Caribbean Sea.

Phosphorus levels were estimated using samples from the Bodélé Depression (an ancient lake bed in Chad) and research stations in Barbados and Miami. This estimate was used to determine the amount of phosphorus deposited in the Amazon basin.

The pattern of dust movement varies greatly from one year to the next. The scientists found that there was an 86 percent difference between the highest amount of dust transported in 2007 and the lowest amount transported in 2011. The researchers believe this variability can be attributed to conditions in the Sahel, a long strip of semi-arid land found along the Sahara’s southern border. It appears that periods of high rainfall in the Sahel coincide with less dust transport the following year.

Though the scientists agree that the data record is too short to make any long-term conclusions, it does offer interesting insight into the movement of dust and other windborne particles as they are blown across the ocean.

“This is a small world,” Yu said, “and we’re all connected together.”

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