

Study Says African Dust Affects Climate in U.S., Caribbean

Cites strong link between dust and decreased rainfall in West Africa

A new study says that trade wind dust transported from West Africa can have significant implications for climate, atmospheric quality and public health in the Caribbean and the southeastern United States.

A November 7 press release says results of the study, reported by researchers of the National Oceanic and Atmospheric Administration (NOAA) and published in the November 7 issue of the journal *Science*, show that trade wind dust transported from West Africa to Barbados in the eastern Caribbean is strongly linked to rainfall patterns in West Africa. The study says decreased rainfall in Africa results in a sharp increase in dust transported across the Atlantic the following year.

Joseph Prospero, director of the NOAA Cooperative Institute for Marine and Atmospheric Studies at the University of Miami -- one of two NOAA institutes involved in the study -- said that since 1970 the Soudano-Sahel region of Africa "has suffered varying degrees of drought, which has caused the amount of dust to increase. The amount of dust transported from Africa could affect south Florida by suppressing rainfall and worsening droughts."

The researchers said the study's findings have implications for climate and public health in the Caribbean and south Florida, and future changes in climate could result in significant changes in emissions from Africa and other arid regions that, in turn, could lead to impacts in climate over large areas.

Previous work by Prospero has shown that large quantities of African dust are carried to the southeastern United States every summer.

Following is the text of the press release:

National Oceanic and Atmospheric Administration
November 7, 2003

STUDY CONCLUDES AFRICAN DROUGHTS AND DUST AFFECT WEATHER IN CARIBBEAN

A recent study conducted by National Oceanic and Atmospheric Administration (NOAA) Joint Institute researchers concluded weather on one continent can affect other parts of the world and result in significant impacts ranging from climate change to public health. NOAA is an agency of the U.S. Department of Commerce.

In a study of African droughts and dust transport to the Caribbean, Joseph M. Prospero, Director of the NOAA Cooperative Institute for Marine and Atmospheric Studies (CIMAS) at the University of Miami and Peter J. Lamb, Director of the NOAA Cooperative Institute for Mesoscale Meteorological Studies (CIMMS) at the University of Oklahoma, combined their career-long research interests to develop new insight into current global problems.

A key result of the study, to be published in the Nov. 7 issue of *Science*, is that trade wind dust transported from West Africa to Barbados in the eastern Caribbean is strongly linked to rainfall in West Africa. Decreased rainfall in Africa results in a sharp increase in dust transport across the Atlantic the following year. The paper discusses the climate change and health implications of the results for the Caribbean and southeastern United

States.

The study draws on the cumulative basic research of both scientists: Prospero's 38 years of collecting dust above the eastern coastline of Barbados, and Lamb's 30 years of developing and maintaining a rainfall index for the Soudano-Sahelian Zone of West Africa, south of the Sahara Desert.

Great quantities of atmospheric dust are carried by the trade winds from Africa over large areas of the North Atlantic and to the Caribbean during much of the year. Measurements from 1965 to 1998 in Barbados show large interannual changes in dust amounts. The researchers compared the dust amounts with African rainfall data, and found a strong relationship between the dust and the previous year's rainfall. Using this relationship, the researchers then were able to reconstruct the dust transport for 1941-64 from long-term rainfall data.

"The study found that dust concentrations were sharply lower during much of the 20th century before 1970, when rainfall across the Soudano-Sahel region was more normal, and when it was especially wet during the 1950s and early 1960s." "Since 1970, the region has suffered varying degrees of drought, which has caused the amount of dust to increase," Prospero said. "The amount of dust transported from Africa could affect south Florida by suppressing rainfall and worsening droughts."

Lamb further explained, "Because of the sensitivity of dust emissions to climate, future changes in climate could result in significant changes in emissions from African and other arid regions that, in turn, could lead to impacts in climate over large areas."

The study's findings have implications for climate, atmospheric quality and public health in the Caribbean and south Florida. Previous work by Prospero has shown that large quantities of African dust are carried to the southeastern United States every summer.

"These results demonstrate how climate processes can bring about changes in our environment that could have a wide range of consequences on intercontinental scales," Lamb said.

The research was supported by grants from the National Science Foundation, National Aeronautics and Space Administration and the NOAA Office of Global Programs.

NOAA's 12 Joint and Cooperative Institutes bring together the resources of a research-oriented university or institution, NOAA Research and other NOAA programs. They promote collaboration between university scientists and NOAA scientists so that academic and government researchers can work together to learn about and apply their knowledge to environmental processes.

CIMAS is a cooperative institute between NOAA and the University of Miami, Fla., located in the Rosenstiel School of Marine and Atmospheric Science. CIMAS serves as a mechanism to bring together the research resources of the university with those of NOAA in order to develop a center of excellence in research that is relevant to understanding the Earth's oceans and atmosphere within the context of the NOAA's mission.

CIMMS is a cooperative institute between NOAA and The University of Oklahoma. The Joint Institute conducts research in hazardous weather, mesoscale meteorology, regional climate and related subject areas. About 190 researchers, post-docs, graduate students and staff are supported in CIMMS.

The Commerce Department's National Oceanic and Atmospheric Administration (NOAA) is dedicated to enhancing economic security and national safety through the prediction and research of weather and climate-related events and providing environmental stewardship of our nation's coastal and marine resources.

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