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NEWS RELEASE

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NCAR Scientists Trek to Africa for Biosphere-Atmosphere Chemistry Study

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BOULDER--Some of the most important sampling to date of biospheric and atmospheric chemistry in the tropical rainforest will culminate in November and December, when a team of scientists from the United States, France, Italy, the Central African Republic (CAR), and the Congo complete a rare study of the African atmosphere. Ground-based and tower-mounted instruments and a research aircraft will support studies of biomass burning, rainforest-savanna boundaries, and the influence of tropical vegetation on global air chemistry.

This fall's field work, which begins on November 10, is the climax of a multiyear project called EXPRESSO, the Experiment for Regional Sources and Sinks of Oxidants. Leaders of the project are the National Center for Atmospheric Research (NCAR), in Boulder, Colorado; Paul Sabatier University, in Toulouse, France; the University of Brazzaville, in the Congo; and L'Institut Français de Recherche Scientifique pour le Developpement en Cooperation. NCAR is operated by the University Corporation for Atmospheric Research under sponsorship of the National Science Foundation, which is providing substantial support for EXPRESSO.

With its vast expanse of land near the equator, Africa exerts a powerful influence on tropical and global air chemistry. Huge stretches of African savanna and rainforest are burned each fall and winter for agricultural and territorial purposes. The fires produce large amounts of hydrocarbons and oxides of nitrogen, which interact with sunlight to produce ozone and other smoglike products--often at levels approaching those of a high-pollution day in a major city. Satellite pictures show that the plumes of ozone stretch, at times, as far as South America.

NCAR scientists have made several trips to Africa in the past three years to take preliminary air samples, install instruments, and make arrangements for this fall's field campaign. These visits spanned the entire transition zone from savanna to rainforest, which runs from the northeast CAR (around 8 degrees N) to the northern Congo (around 2 degrees N).

This fall's campaign is focused at two sites: one in rainforest near the Congo's Nouabale-Ndoki National

Park and the other in the rainforest-savanna transition zone near Bangui, the CAR capital. EXPRESSO is collecting chemical data at these sites--along with meteorological data throughout the study area--to explore how the vegetation and fires interact with the atmosphere. "There's never been a program in this region that has combined all the elements of photochemistry, biochemistry, and meteorology," says NCAR's Pat Zimmerman.

The experiment's logistics are challenging. Early this year, scientist Lee Klinger and colleagues met a truck and trailer that were shipped across the Atlantic; drove them across Cameroon; and then accompanied them on a barge up the Sangha River to the Ndoki site, located near one of Africa's most-remote and best-preserved rainforests.

To sample the African atmosphere, EXPRESSO is using

- enclosures that measure atmospheric exchange from leaves and soil
- a 60-meter tower studded with meteorological instruments and air samplers
- a balloon tethered for brief periods at heights of up to a kilometer
- France's Arat research aircraft, flying out of Bangui

While relying on many standard sensors, EXPRESSO will serve as the debut for some specialized equipment, including a new isoprene flux sampler (built by NCAR's Alan Hills) that is "the world's best," according to Klinger. Isoprene, a fast-reacting chemical emitted by trees, plays an important role in the atmosphere's overall chemical balance. "Measuring isoprene is a key to this experiment," says Klinger.

On hand for the field work will be five NCAR scientists and technicians, along with four scientists from the University of Brazzaville and collaborators from Paul Sabatier University, the California Institute of Technology, Germany's Max-Planck Institute, and the New York-based Wildlife Conservation Society. Once the intensive field work is done, some of the instruments for monitoring weather and air chemistry will be maintained by the European and African collaborators for longer-term EXPRESSO research.

EXPRESSO may shed light on a global problem in biosphere-atmosphere chemistry. Plants take up vast amounts of carbon, particularly in the lush tropics, but plants and soils also release carbon, and the overall cycling in the tropics may be affected by the perennial fires. "One big question we're asking," says NCAR/EXPRESSO field project leader Alex Guenther, "is whether the tropics serve as a net source or a net sink for carbon. Right now, we don't really know. One study won't answer the question, of course, but it will provide a starting point. Tropical forest landscapes are an important component of the global carbon cycle, so any imbalance there can have global consequences."

Writer: Bob Henson

NOTE TO EDITORS: Photographs accompanying this release are available as color transparencies or as high-resolution digitized slides. They may be viewed in color on the World Wide Web at the address below. For more photo information or arrangements, contact Nita Razo, 303-497-8606, razo@ucar.edu, or Linda Carbone, 303-497-8612, lcarbone@ucar.edu, at NCAR Visual Communications.

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