

OVERVIEW OF NIGEC:

NATIONAL INSTITUTES FOR
GLOBAL ENVIRONMENTAL

CHANGE: <http://nigec.ucdavis.edu>

Jeff Gaffney

Rainfall Manipulation Plots



OPEN TOP CHAMBERS



WHAT IS NIGEC?

The National Institute for Global Environmental Change is a funded activity of the U.S. Department of Energy. NIGEC focuses its attention at a regional level by dividing the U.S. into six separate regions in order to take into account geographical and geological diversity when researching the consequences of environmental change for the United States. Since the Institute's inception in 1990, its mission has been to assist the nation in its response to human-induced influence on the environment by pursuing excellent research in the field of global climate change.

The U.S. Congress established the National Institute for Global Environmental Change in the Energy and Water Development Appropriations Act of 1990. The University of California operates the Institute for the DOE under a cooperative agreement.

Although NIGEC studies the effects of global environmental change, its focus remains national. To this end, the institute divides the U.S. into six separate regions in order to study environmental change on different geographical and geological systems. These six regions are: Great Plains, Midwest, Northeast, Southcentral, Southeast, and West. These regions represent all 50 states in addition to Puerto Rico and the Virgin Islands.

Each region has a "host institution" - a prominent university that appoints a Regional Director who acts in an administrative capacity. Regional centers develop their own research programs by soliciting proposals from scholars around the nation. These programs must focus on areas important to global environmental change and meet DOE research priorities. Centers issue a joint annual Request for Proposals (RFP), but select only the most excellent for funding.

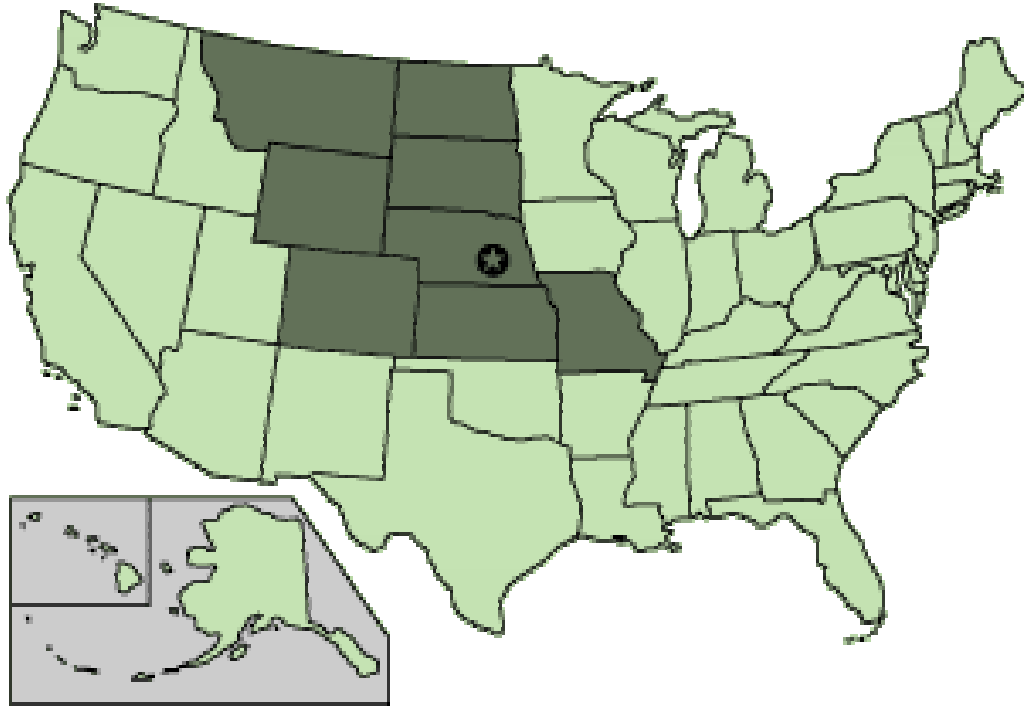
NIGEC GOALS:

- Improving scientific understanding of the mechanisms of global environmental and climate change;
- Reducing uncertainties surrounding key scientific environmental and climate change issues;
- Creating innovative experimental or observation programs to enhance the understanding of regional scale, or ecosystem scale, processes contributing to global change;
- Improving decision-making tools that are appropriate for the global environmental and climate change issues;
- Building education and training opportunities and development of new curriculum materials to increase the flow of talented young people into global environmental change research areas;
- Focusing contributions to the public education on the subject of global climate change.

Congressionally Developed Objectives

- The provision of information to the Department of Energy on energy-related technical data and finite models for the U.S. component of the international discussions on global climate change,
- The development of finite models that can be used to enable public officials to assess energy-related environmental risks,
- Creating innovative experimental or observation programs to enhance the understanding of regional scale, or ecosystem scale, processes contributing to global change;
- The preparation and conduct of public education programs on global warming and other energy-related environmental risks,
- The provision of training opportunities for graduate students and young scientists in environmental and related studies.

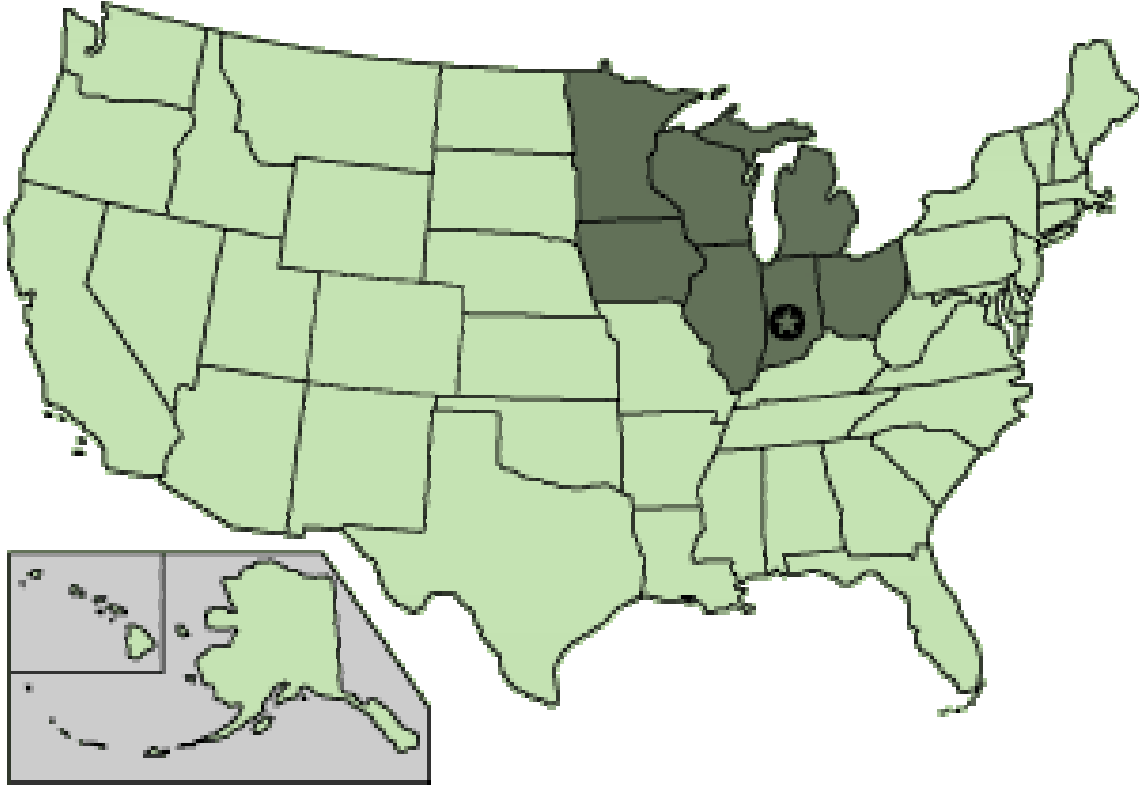
REGIONAL CENTERS



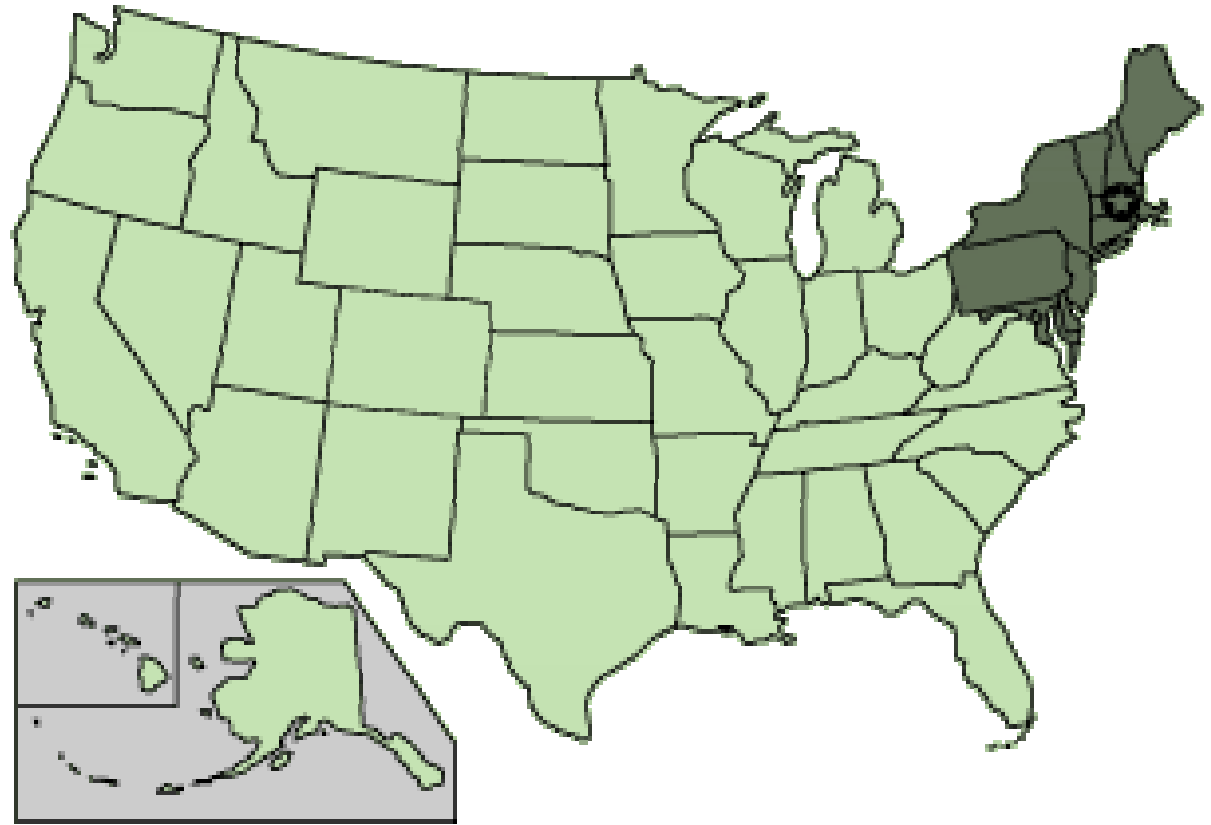
GREAT PLAINS

UNIVERSITY OF NEBRASKA, LINCOLN

MIDWESTERN

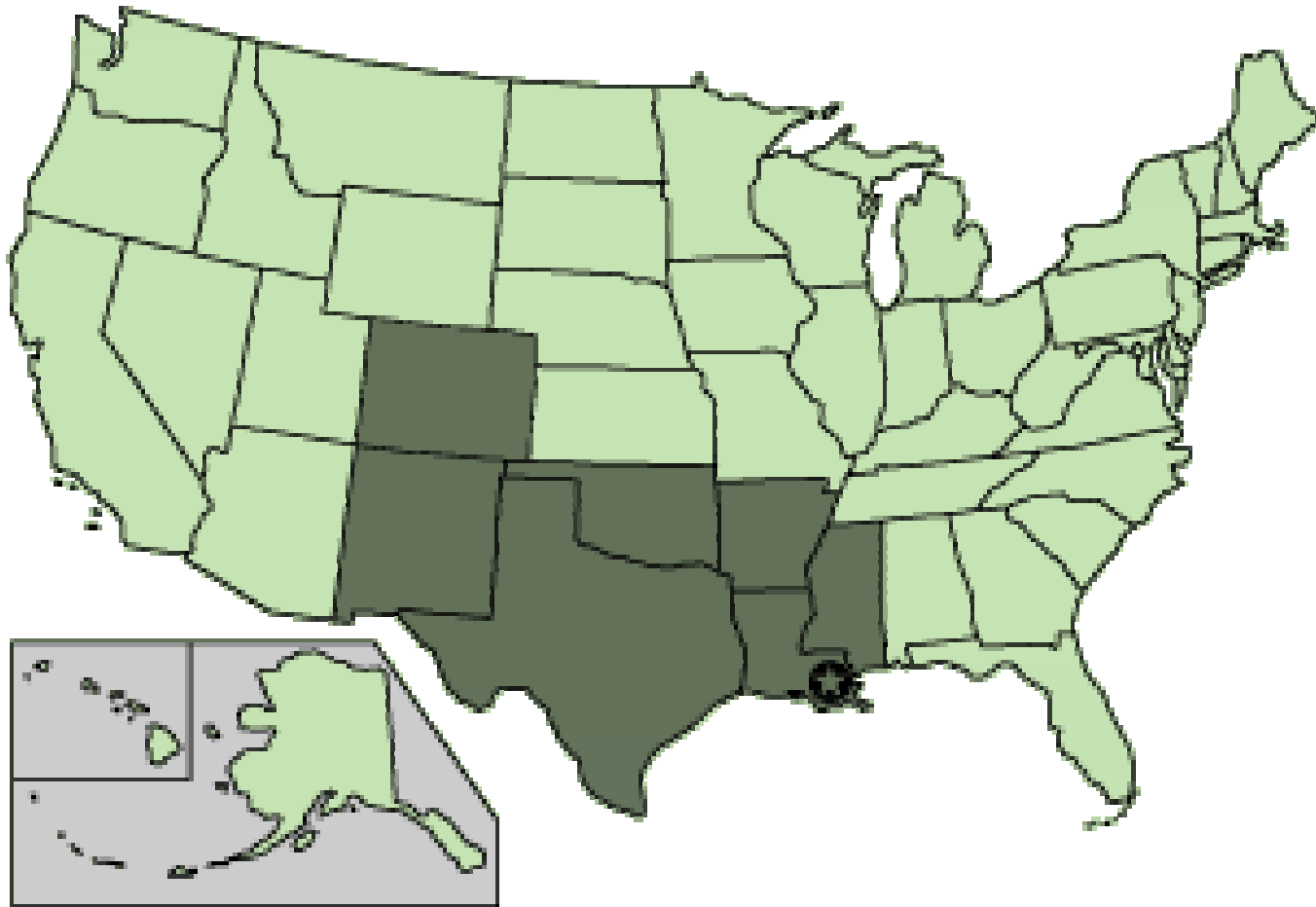


INDIANA UNIVERSITY, BLOOMINGTON



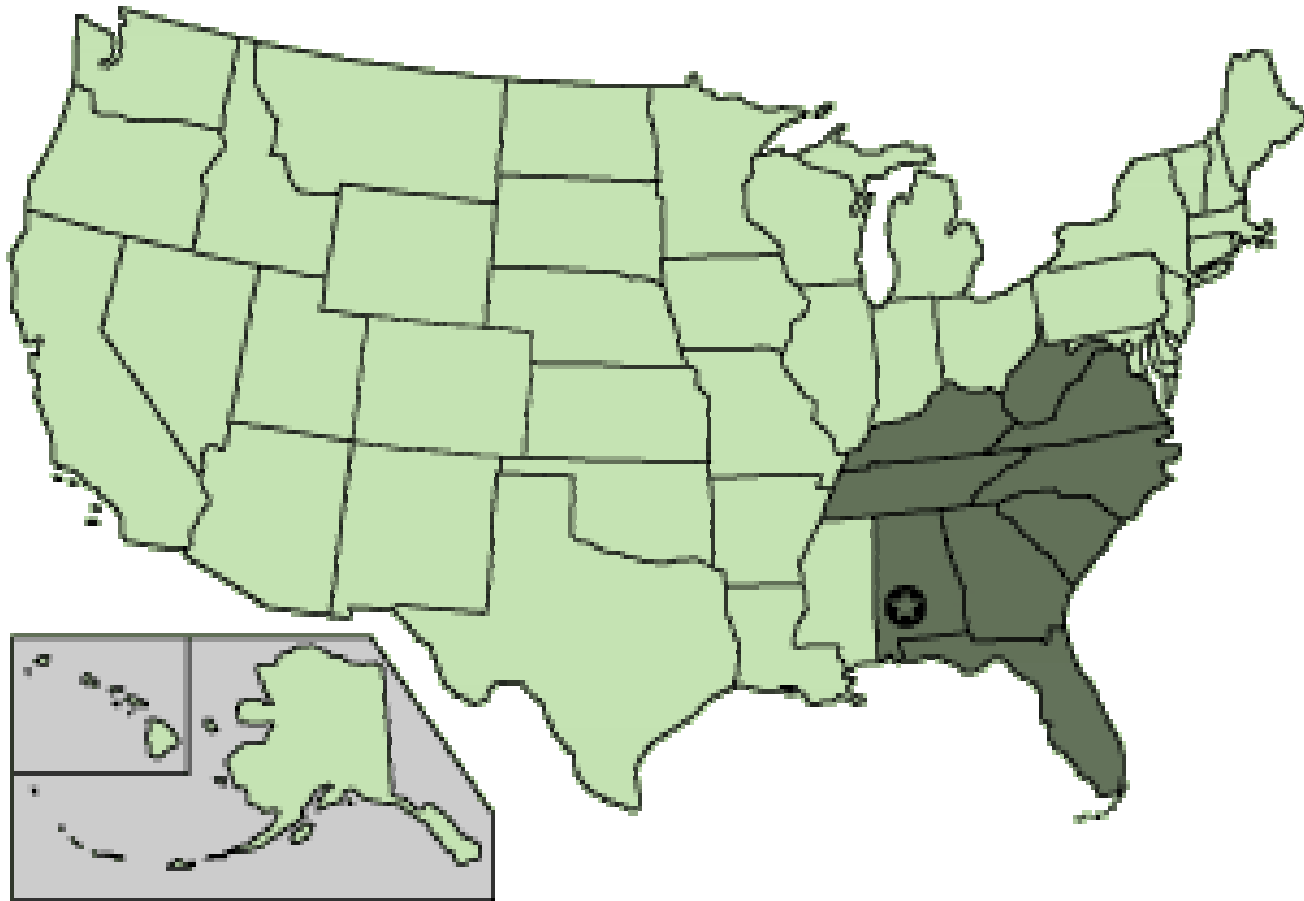
NORTHEAST

HARVARD UNIVERSITY



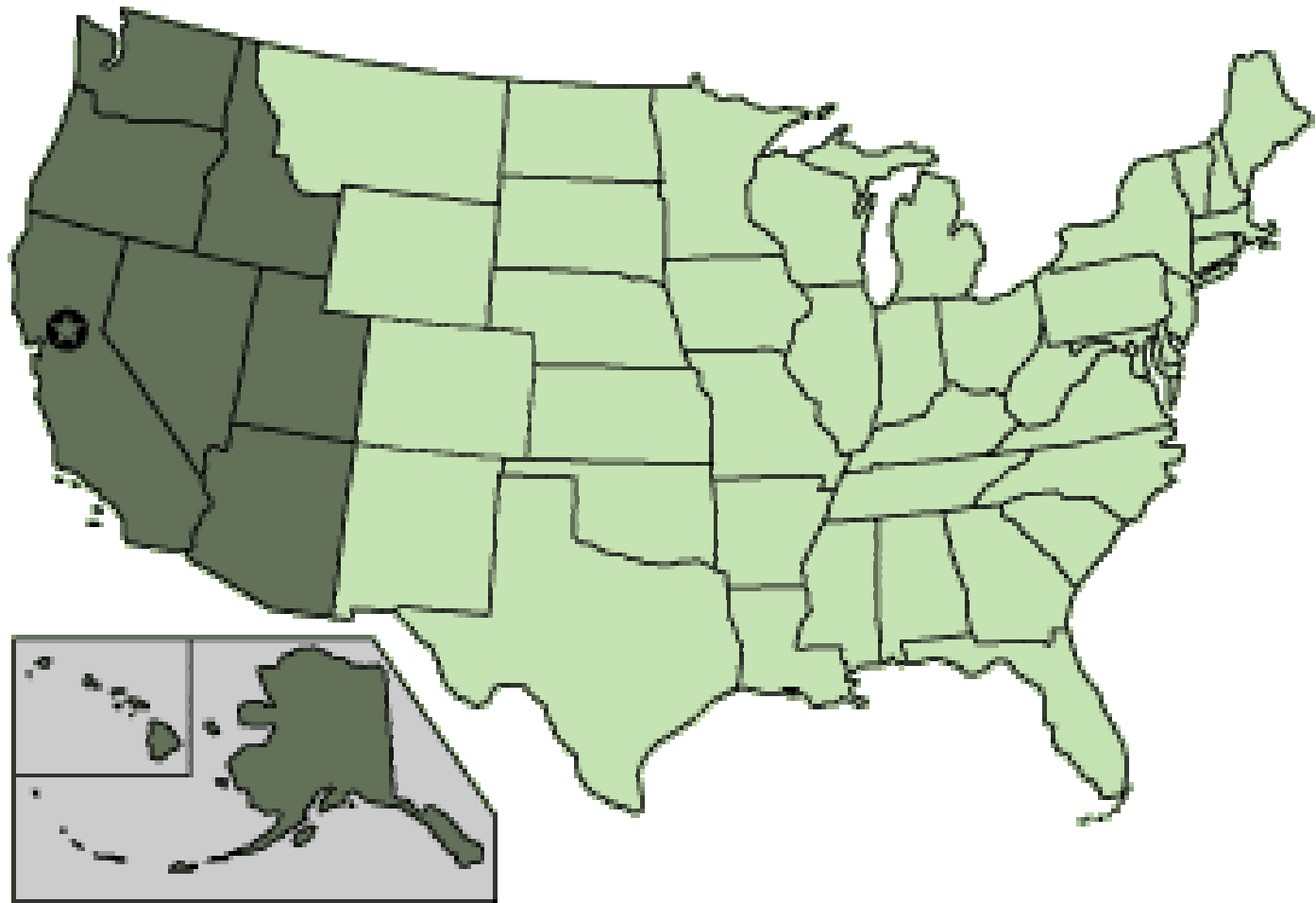
SOUTHCENTRAL

TULANE UNIVERSITY



SOUTHEAST

UNIVERSITY OF ALABAMA



WESTGEC

UNIVERSITY OF CALIFORNIA, DAVIS

ALSO SERVES AS NATIONAL CENTER FOR
NIGEC

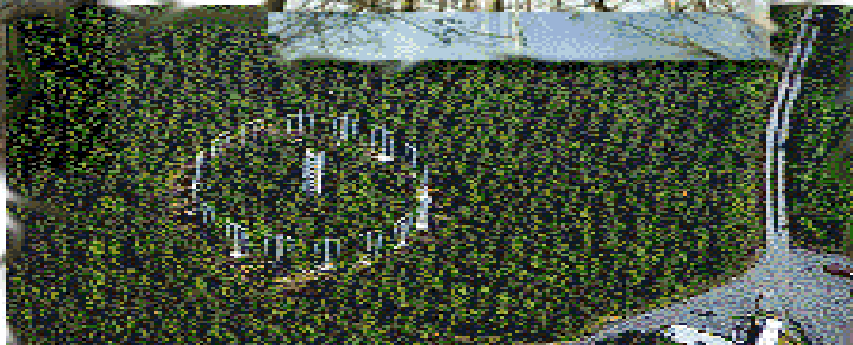
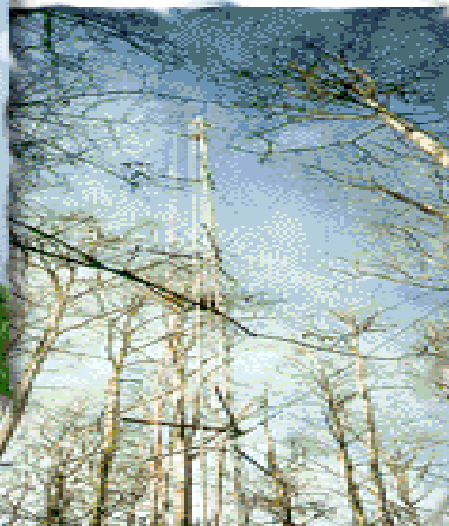
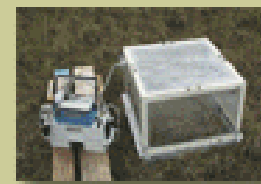
NIGEC INITIATIVES

AMERIFLUX

**The Ecological Effects of Environmental Change
(EEEC)**

**Northeast Regional Center of NIGEC Summer
Undergraduate Research Fellowships in the Area
of Global Environmental Change**

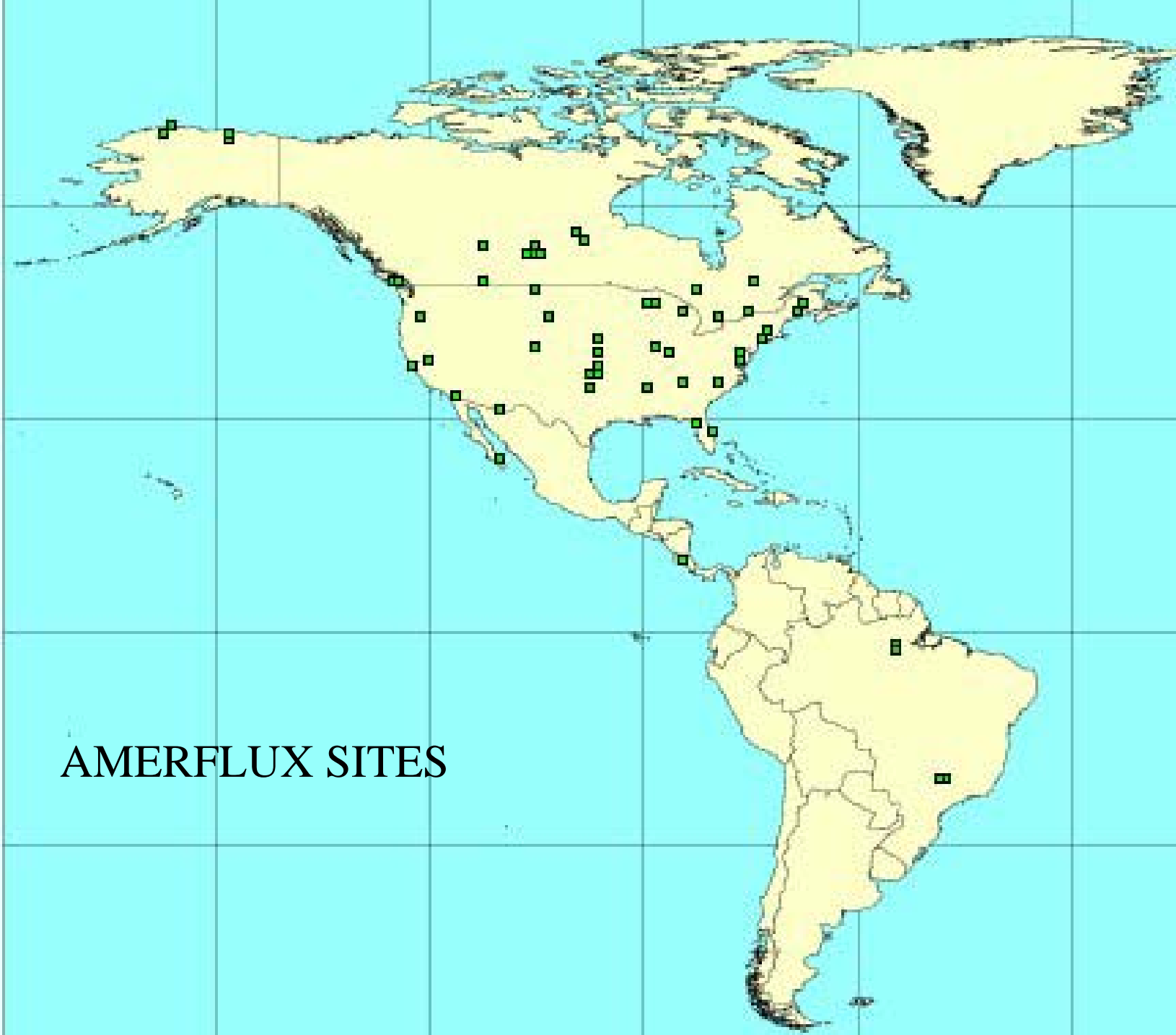
AmeriFlux



The AmeriFlux network, established in 1996, provides continuous observations of ecosystem level exchanges of CO₂, water, energy and momentum spanning diurnal, synoptic, seasonal, and interannual time scales.

AmeriFlux Objectives

- establish an infrastructure for guiding, collecting, synthesizing, and disseminating long-term measurements of CO₂, water, and energy exchange from a variety of ecosystems
- collect critical new information to help define the current global CO₂ budget
- enable improved predictions of future concentrations of atmospheric CO₂
- enhance understanding of carbon fluxes, Net Ecosystem Production (NEP), and carbon sequestration in the terrestrial biosphere



AMERFLUX SITES

MEASUREMENTS AT THE SITES ARE VERY COMPLETE

GAS FLUX – CO₂ AND WATER VAPOR

RADIATION MEASUREMENTS – TOTAL –
PHOTOSYNTHETIC

ALBEDO

METEOROLOGICAL MEASUREMENTS

TEMPERATURE – WIND SPEED AND DIRECTION\

PRECIPITATION, ETC.

ECOLOGICAL MEASUREMENTS – STEM FLOW, ROOT
GROWTH, ETC.

FOR MORE ON AMERIFLUX SEE:

<http://public.ornl.gov/ameriflux/>

The Ecological Effects of Climate Change

- How will ecosystems respond to simultaneous changes in the mean and extremes of climate variables (including temperature and precipitation) in combination with increasing concentrations of atmospheric carbon dioxide and other trace gases such as ozone? How will these responses be affected by other projected and/or ongoing environmental changes (e.g. changing land use)?
- How well do existing process models simulate observed responses of ecosystems to variation and changes in the current climate system and to past changes in climate?
- What is the capacity of ecosystems to adapt to environmental changes and are there thresholds of climate change, with respect to either magnitude or rate of change, above which ecosystems are unable to adapt, with the result that irreversible impacts on ecosystem structure and function occur?
- How will the quantitative links between cycles of carbon, water, energy and nutrients be affected by changes in multiple environmental factors?
- What will be the quantitative effects of multiple environmental changes on relationships between plants and pests (e.g. insects and disease) and between higher animals and parasites?

**NORTHEAST REGIONAL CENTER OF THE
NATIONAL INSTITUTE FOR GLOBAL ENVIRONMENTAL
CHANGE**

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**SUMMER UNDERGRADUATE RESEARCH FELLOWSHIPS
IN THE AREA OF GLOBAL ENVIRONMENTAL CHANGE**