

**REQUEST FOR PROPOSALS
TO PARTICIPATE IN
THE RESEARCH PROGRAM
ADMINISTERED BY
THE DEPARTMENT OF ENERGY's
NATIONAL INSTITUTE FOR
GLOBAL ENVIRONMENTAL CHANGE
FOR FISCAL YEAR 2005-2006**

Letters of Intent due **16 July 2004**
(Strongly encouraged)

Proposals due 27 August 2004

**THE DOE NATIONAL INSTITUTE
FOR GLOBAL ENVIRONMENTAL CHANGE**
For fiscal year 2005-2006

1. Background

1.1 Establishment of NIGEC

The U.S. Congress under the Energy and Water Act of 1989 established the National Institute for Global Environmental Change (NIGEC). The University of California operates NIGEC for the U.S. Department of Energy (DOE) under a cooperative agreement with DOE's Office of Science. The purpose of NIGEC is to plan jointly with DOE, and to execute, through regional centers, a program of research in global environmental change relevant to DOE's climate change research program. More information about NIGEC can be found at <http://nigec.ucdavis.edu> and at <http://www.science.doe.gov/ober/CCRD/nigec.html>.

1.2 Regional Organization of NIGEC

NIGEC divides the United States into six regions to facilitate study of regional issues related to environmental change. NIGEC's regional centers are: the Great Plains Regional Center located at the University of Nebraska, Lincoln; the Midwestern Regional Center located at Indiana University, Bloomington; the Northeast Regional Center located at Harvard University; the Southcentral Regional Center located at Tulane University; the Southeast Regional Center located at the University of Alabama, Tuscaloosa; and the Western Regional Center located at the University of California, Davis. The national office of NIGEC is located at the University of California, Davis.

1.3 Strategic Vision of NIGEC

NIGEC supports university researchers developing scientific knowledge of effects of (potential) environmental changes associated with energy production on national resources (especially terrestrial ecosystems) with an emphasis on issues at the regional scale.

1.4 Research Priorities of NIGEC

NIGEC supports research on four areas:

- Exchange of carbon (e.g., uptake of atmospheric CO₂) by U.S. terrestrial ecosystems;
- Effects of environmental change associated with energy production on U.S. terrestrial ecosystems;
- Development and testing of ecosystem models needed for integrated assessments; and
- Effects of sulfur-based and/or carbon-based aerosols on earth's radiation balance (new this year).

2. Research Supported by NIGEC

2.1 Exchange of Carbon (e.g., Uptake of Atmospheric CO₂) by U.S. Terrestrial Ecosystems

NIGEC engages the multidisciplinary expertise of university researchers to study the carbon balance of terrestrial ecosystems in the United States. This is important because terrestrial ecosystems can take up significant amounts of CO₂ annually and can store this carbon for decades, or longer. Better understanding of the role of terrestrial ecosystems in the global carbon cycle is needed to reduce uncertainties about future atmospheric CO₂ concentrations and how they relate to anthropogenic emissions of CO₂.

NIGEC supported development of the AmeriFlux network of carbon measuring flux tower sites, including approximately 15 sites, located mostly in forested, grassland, and agricultural ecosystems. Exchange of CO₂, water vapor, and energy are measured continuously for long periods (years) by direct flux measurement techniques, primarily eddy covariance. The objective is to understand the factors regulating net CO₂ exchange with the atmosphere in major U.S. terrestrial ecosystems, including vegetation structure and functioning, soil

and ecological processes, stage of succession, land-use history, and ecosystem management practices. Coordinated, systematic measurements of environmental conditions, ecological and physiological processes and states, manipulations at the main study sites, and modeling and synthesis activities are combined with the measured flux data to address the following questions:

- What are the relationships between CO₂ exchange and underlying environmental and ecological parameters?
- What are the most important factors in terrestrial ecosystems regulating CO₂ exchange that operate on the longer time scales most relevant to climate issues (years to decades)?
- What are the short-term and long-term effects of climatic change, variability, and extremes, air pollution, and increasing CO₂ concentrations on the net exchange of CO₂ by major terrestrial ecosystems in the United States?
- How can tower flux data be used to scale up from point measurements to regional and continental scale carbon balances?

At some sites, a variety of trace gas parameters (pollutant concentrations, isotope ratios, O₂/N₂ ratios, etc.) are measured. The goals of this additional research are to help distinguish between fossil fuel and biotic influences on atmospheric greenhouse gas concentrations, to explain effects of air pollution and anthropogenic nutrient inputs on terrestrial ecosystems, and to study long-term trends in these external influences on major terrestrial ecosystems.

Each AmeriFlux tower site has a site-specific science team, and work across sites is coordinated at the national level through the AmeriFlux Science Team. The science teams help to refine science goals, assess progress, validate measurements, and identify information gaps requiring new research. The AmeriFlux Science Team Leader implements inter-site calibration exercises and scientific forums for the network, and is responsible for scientific oversight. More information on AmeriFlux sites, participants, experimental procedures, and the AmeriFlux Science Plan is available at <http://public.ornl.gov/ameriflux/Participants/Sites/Map/index.cfm>. Data sharing is required by AmeriFlux participants.

2.2 Effects of Environmental Change Associated with Energy Production on U.S. Terrestrial Ecosystems

NIGEC supports university scientists studying effects of environmental changes associated with energy production on important terrestrial ecosystems in the United States (research in wetlands is presently outside the scope of this element of NIGEC research). The environmental changes of most interest are warming, increasing atmospheric CO₂ levels, intensification of the global hydrologic cycle, and increasing tropospheric O₃ levels. These changes are the focus of this element of NIGEC research.

When possible, research should consider effects of changes in multiple factors on terrestrial ecosystems. For example, previous research has shown clear positive effects of increasing CO₂ and negative effects of increasing tropospheric O₃ on net primary production (NPP), but what is the effect on NPP of simultaneous increases in both CO₂ and O₃? What are the effects of warming in combination with changes in precipitation and elevated CO₂ on ecosystem structure or functioning? The two overarching questions to be addressed are:

- How will the structure and functioning of terrestrial ecosystems be affected by simultaneous *changes* in climate and other factors associated with energy production such as increasing CO₂ and O₃ concentrations? Research addressing this question will involve experimental manipulation of environmental conditions either in the field or the laboratory.
- What is the capacity of terrestrial ecosystems to adapt (or acclimate) to environmental changes associated with energy production, and are there thresholds of environmental change (with respect to either magnitude or rate of change) above which ecosystems are unable to adapt?

When appropriate, use of existing DOE facilities and sites for ecosystem research is encouraged. More information on facilities and sites can be obtained from the NIGEC Program Manager (see www.science.doe.gov/ober/CCRD/nigec.html).

2.3 Development and Testing of Ecosystem Models Needed for Integrated Assessments

NIGEC supports university scientists developing and testing ecological models that can (could) be used in integrated assessments of effects of climatic change. NIGEC will not support (1) an integrated assessment per se, (2) development of climate scenarios, nor (3) modeling aimed simply at predicting effects of climate scenarios on ecosystems (or economies). Rather, NIGEC will support testing (evaluating) and improving ecosystem models and databases needed for future integrated assessments. In particular, NIGEC will support research performed to:

- Evaluate and/or extend the accuracy of models of managed and unmanaged ecosystems that are, or might be, used for integrated assessments, or
- Develop and/or evaluate methods of coupling ecosystem models to other model types (e.g., climatic and economic) as needed for integrated assessments.

Important questions to be addressed are:

- How well do existing ecosystem models simulate observed responses of terrestrial ecosystems to past climatic variation and change and to past changes in other environmental factors associated with energy production such as increasing atmospheric CO₂ and tropospheric O₃ concentrations?
- How well do existing ecosystem models simulate responses to environmental changes imposed in manipulative experiments involving climatic variables (e.g., temperature and/or precipitation), elevated CO₂, and/or elevated O₃?

2.4 Effects of Sulfur-based and/or Carbon-based Aerosols on Earth's Radiation Balance: Cross Regional Research

Beginning this year, NIGEC will support university scientists to study effects of sulfur-based and/or carbon-based aerosols on earth's radiation balance. Effects of aerosols on climatic change is an area of considerable uncertainty that has quantitatively important implications for predicting future climatic change. Research on this topic supported by NIGEC will have application to improving the treatment of aerosols in climate models, including both the direct effect of aerosols on the radiation balance due to scattering and absorption of radiation by aerosols in otherwise clear (i.e., cloud-free) skies as well as the indirect effects of aerosols on the amount and microphysical and microphysical properties of clouds.

This year NIGEC solicits proposals for research in two areas associated with effects of aerosols on radiative forcing of climate

1. Focused laboratory studies to characterize properties of aerosols directly relevant to improving climate models (i.e., aerosol-radiation interactions and effects of aerosols on cloud microphysical properties), and
2. Modeling studies directly related to improving the treatment of direct and/or indirect effects of aerosols on earth's radiation balance in climate models.

It is expected that seven awards will be made this year, with an average project budget of \$100,000/year. Letters of Intent and Proposals should be submitted to the Regional Center representing the state within which the Principal Investigator's university resides. The Letters of Intent and Proposals will be evaluated by a single NIGEC-wide panel.

3. The Regional Centers and Their Research Interests

3.1 The Great Plains Regional Center (GPRC)

The Great Plains Region, encompassing the nation's largest grassland biome, consists of Colorado, Iowa, Kansas, Minnesota, Missouri, Montana, Nebraska, North Dakota, South Dakota, and Wyoming. Support for research in Colorado is shared with the Southcentral Regional Center.

3.1.1 GPRC Strategic Vision

The Great Plains region is typified by strong climatic gradients, fertile carbon-storing soils, and important agricultural and grassland systems. The GPRC is devoted to research that develops quantitative information on net carbon exchange by ecosystems that are important to the region, and enhances understanding of effects of environmental change on those ecosystems. Through its research, the GPRC provides scientific information needed to identify the consequences of environmental change on social, physical, and biological resources within the region.

3.1.2 GPRC Specific Goals

The primary goal of the GPRC research is to increase basic understanding of how agricultural and grassland ecosystems exchange carbon with the atmosphere, and of how environmental changes associated with energy production may affect key ecosystems in the region. Specific goals are:

Goal 1: To increase understanding of the net carbon exchange in relevant ecosystems and the processes involved.

The GPRC supports research on the measurement and analysis of net exchange of CO₂ between the atmosphere and terrestrial ecosystems (e.g., agricultural and grassland ecosystems). This research addresses the following questions. What are the net annual CO₂ exchanges and interannual variability in those exchanges by key ecosystems in the region? What biophysical and physiological factors control the earth's surface exchange rates of CO₂ and water vapor? What is the role of belowground processes in regulating carbon exchange? And, to help obtain a full accounting of carbon budgets, what are the carbon costs of energy used in crop management and other practices (e.g., CO₂-C released during N fertilizer production, irrigation, grain drying). Contingent on availability of funds, the GPRC expects to fund two or three modest size projects (\$55,000 to \$110,000 per year) in this subject area in the 2005-06 period.

Goal 2: To understand the consequences of environmental changes on terrestrial ecosystems.

The GPRC supports research to determine effects of (future) environmental changes associated with energy production (see Sec. 2.2 for more details) on ecosystems. Contingent on availability of funds, the GPRC expects to fund one modest size project (\$80,000 to \$110,000 per year) in this subject area in the 2005-06 period.

Goal 3: To develop and test tools needed for integrated assessments.

The GPRC supports the development and testing of the tools needed for integrated assessments of impacts of environmental change in the Great Plains region. Because of commitments to on-going projects, the GPRC will not be able to support new projects in this subject area during the 2005-06 period.

Goal 4: To evaluate effects of sulfur-based and/or carbon-based aerosols on earth's radiation balance.

The GPRC will collaborate with the other regional centers to fund projects in the new NIGEC aerosol-climate interaction research initiative (see Sec. 2.4 for details).

3.2 The Midwestern Regional Center (MRC)

The Midwestern Region consists of Ohio, Indiana, Illinois, Michigan, and Wisconsin. In these states, agriculture is the single largest land use, with 61% of land area devoted to crops and pasture. The second largest category is forests, about 27%. Wetlands, predominantly in Wisconsin and Michigan, comprise about 7%. About 5% of total land use is urban and built-up; the region has 20 cities of greater than 100,000 people.

3.2.1. MRC Strategic Vision

The strategic vision of the MRC is to conduct a high quality, integrated program of research that increases

scientific understanding and quantifies how Midwestern agricultural row crops (corn, soybeans, wheat) and forests (northern hardwoods, aspen-pine, central transition, and oak-hickory) sequester carbon from the atmosphere, and how environmental change and variability may affect these ecosystems from year to year.

3.2.2. MRC Specific Goals

Goal 1: To investigate carbon exchange dynamics and atmospheric effects on Midwestern forest and agricultural ecosystems.

Analyses will continue using both eddy covariance methods and ecological inventory methods to quantify the productivity and carbon dynamics of forest ecosystems in the region. The goal is to define, analyze, and model the specific processes and mechanisms that contribute to the spatial and temporal variation in CO₂ sources and sinks as a result of differences in weather, species, and previous management practices. Studies of ecological processes particularly important to carbon dynamics (e.g., bole growth, phenology, fine root turnover, photosynthesis, soil respiration) are encouraged. The MRC will emphasize comparative analyses which examine (1) inter-annual variation in net carbon exchange and associated weather variability, (2) carbon dynamics across several forest sites with contrasting climatic, edaphic, and biological factors and processes, and/or (3) differences in carbon flux measurement and modeling methodologies.

Subject to availability of funds, the MRC anticipates funding one new project, in the range \$80,000-150,000 per year, addressing this goal.

Goal 2: To examine possible effects of environmental change associated with energy production on terrestrial ecosystems.

The MRC will support research that examines possible effects of (multiple) environmental changes associated with energy production (see Sec. 2.2 above) on forested and agricultural ecosystems. Interactions between environmental changes associated with energy production and human manipulations of ecosystems are also of interest. For example, studies that examine ecosystem-level interactions with pests, pathogens, or invasive species, or that consider human manipulation of land cover in the context of energy production and associated environmental changes are encouraged. Projects may be experimental (laboratory and/or field) combined with modeling. When appropriate, use of existing DOE research facilities and field sites for ecosystem research is encouraged.

Subject to availability of funds, the MRC anticipates funding one new project, in the range \$80,000-150,000 per year, addressing this goal.

Goal 3: To evaluate effects of sulfur-based and/or carbon-based aerosols on earth's radiation balance.

The MRC will collaborate with the other regional centers to fund projects in the new NIGEC aerosol-climate interaction research initiative (see Sec. 2.4 for details).

3.3 The Northeast Regional Center (NERC)

The Northeast Region includes Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. These states have >80% forest cover of young to middle age, representing significant economic and environmental resources. This region has been singled out as a likely locale for globally significant net carbon uptake by temperate forest ecosystems.

3.3.1 The NERC Strategic Vision

The strategic vision of the NERC emphasizes integrated research on ecological responses of forests to management, climatic change, and environmental stressors (air pollution, inputs of nutrients, heavy metals, and acids). The focus is on quantifying the structure, development, and productivity of forests, and the net uptake of atmospheric CO₂ by forests of northeastern North America. NERC emphasizes interdisciplinary

research with process studies and modeling integrated within a framework of unique, long-term quantitative observations and manipulations. A new area of emphasis includes laboratory and modeling studies of aerosols with a focus on effects of aerosols on atmospheric radiation.

Long-term eddy flux observations at two sites, Harvard Forest (Petersham, MA) and Howland Forest (Howland, ME), provide the anchors for the carbon cycle components of the program. These sites are the focus for a diverse set of manipulations (e.g., open-top chambers, logging, soil warming, and nutrient additions), ecological studies, stable isotope measurements, analysis of meteorological and environmental observations, measurements of concentrations and deposition of air pollutants, modeling, and historical and palynological studies. They are the longest running of the continuous eddy flux measurements in the AmeriFlux network, and have served as testing grounds to resolve methodological issues in long-term flux measurements. These issues continue as a current focus.

The aerosol science component emphasizes the radiative effects as indicated in the program announcement of DoE's Atmospheric Science Program (ASP [<http://www.atmos.anl.gov/ASP/>]).

NERC functions as a Science Team to bring these diverse disciplines together. Scientists supported by NERC communicate often and meet annually to review results and plan coordinated work. All data are required to be shared soon after collection with NERC researchers, through the annual meeting, and with the public through the NIGEC-NERC data archive (<http://www-as.harvard.edu/data/data.html>) and the AmeriFlux data archive (<http://cdiac.esd.ornl.gov/programs/ameriflux/data2.htm>). The policy of maximum data sharing is viewed as essential to success of the NERC strategic vision.

3.3.2. NERC Specific Goals

NERC goals for the upcoming year are to:

Carbon cycle

- Compare and reconcile independent methods for closing the carbon budgets and measuring NPP and GPP of forest ecosystems using eddy flux measurements, intensive ecological studies, data from the Forest Inventory and Analysis (FIA) program of the USDA Forest Service, and satellite data.
- Pursue the goals of the North American Carbon Program, with emphasis on developing models that synthesize long-term observations at the principal sites, including quantitative treatment of effects of environmental changes associated with energy production (e.g., increasing CO₂ and deposition of nutrients and air pollutants), environmental variations, episodic perturbations (e.g., severe storms, insect infestation, logging), and legacies of prior land use.
- Develop the conceptual framework for comparing results across global biomes, and for applying results from these study sites to regional and global issues.
- Provide critical tests of concepts through manipulations and observations, and help develop remote sensing algorithms for new instruments to measure ecosystem health, productivity, and response to environmental forcings.
- Provide continuous observations as part of AmeriFlux.

Aerosol program

- Conduct innovative experiments defining the optical properties of atmospheric aerosols.
- Incorporate new concepts into computer simulations of atmospheric aerosol radiative properties, with a view towards refining model predictions so that they can be rigorously tested in ASP field programs.

The NERC expects to be able to fund 1-2 new projects, including one in the new NIGEC aerosol-climate interaction research initiative (see Sec. 2.4 for details), of average size (approximately \$75,000/yr) during 2005-2006.

3.4. The Southcentral Regional Center (SCRC) The Southcentral Region consists of the states of Arkansas, Louisiana, Mississippi, New Mexico, Oklahoma, and Texas. Support for Colorado is shared with the Great Plains Regional Center.

3.4.1. The SCRC Strategic Vision

The SCRC supports research that improves the understanding of the effects of environmental changes associated with energy production on key ecosystems in the region. Targeted research topics include carbon exchange studies for the dominant ecosystems of the region and effects of multiple environmental changes on the structure and functioning of ecosystems.

3.4.2. SCRC Specific Goals

The Southcentral Regional Center will participate in the new NIGEC aerosol-climate interaction research initiative described in 2.4 above. Other goals for the upcoming year center around (1) terrestrial ecosystem carbon exchange studies and (2) experiments focusing on the effects of multiple environmental changes associated with energy production on key terrestrial ecosystems in the region (see Sec. 2.2 above). Specifically, proposals for CO₂ flux measurements and modeling in important terrestrial ecosystems in the region are sought. Some important topics to be addressed by this research are:

- The mechanisms that control the ecosystem carbon fluxes, and the dependence of these mechanisms on seasonal and interannual changes in climate and plant phenology.
- The effect on carbon exchange dynamics in forests and grasslands, caused by extreme conditions such as drought or seasonal flooding as well as pollutants and the influence of the climate variability on such effects.
- The effect of environmental changes associated with energy production on woody encroachment into grasslands and pastures in the region. The effect of these environmental changes on the encroachment, the yield and species composition in the grasslands and pastures.
- The role of climatic variability in grassland composition and productivity, and the effect of increased variability at different time scales (diurnal, seasonal, and/or interannual) on the grasslands in the region.
- The development of modeling tools for the integration and extrapolation of experimental and field conclusions.
- The effect of environmental measurement uncertainty, particularly in the case of simultaneous effects of multiple environmental changes, on the modeling of carbon exchange and ecosystems.

Subject to availability of funds, the SCRC anticipates funding one new project in the new NIGEC aerosol-climate interaction research initiative (see Sec. 2.4 for details), and one new project addressing the questions above. Typical awards will be in the range of \$80,000-110,000 /year.

3.5 The Southeast Regional Center (SERC)

The Southeast Region consists of Alabama, Florida, Georgia, Kentucky, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia along with the Commonwealth of Puerto Rico and the U.S. Virgin Islands Territory.

3.5.1 SERC Strategic Vision

The SERC strategic vision is to conduct a high-quality focused research program directed at understanding the consequences of climatic and atmospheric changes associated with energy production on major terrestrial ecosystems and resources in the Southeast United States. For more information about the region and SERC, see <http://sercnigec.ua.edu/mission.html>. Specific questions of interest are:

- What are the net carbon exchanges in terrestrial ecosystems in the southeast and how do southeastern ecosystems contribute to the global carbon cycle and other greenhouse gas fluxes?
- What are the effects of environmental change on southeastern terrestrial ecosystems?

3.5.2 SERC Specific Goals

Goal 1: To increase understanding of terrestrial ecosystem carbon exchange.

The SERC supports research to determine the roles of major southeastern ecosystems in the global carbon cycle, greenhouse gas fluxes, and processes controlling atmospheric CO₂, including belowground carbon exchange. The specific goal is to answer the following questions:

- Are southeastern terrestrial ecosystems sources or sinks of atmospheric carbon and how might their source/sink status be affected by environmental change?
- What are the important processes and mechanisms controlling the exchange of CO₂ between the atmosphere and the terrestrial biosphere of the Southeast, particularly belowground carbon exchange?

Any project examining process-based parameters at specific sites should be conducted in terms of variability across the regional landscape.

The SERC strategy for implementing the above goal is to continue to support AmeriFlux sites in the region.

Goal 2: To investigate potential ecological effects of environmental change.

The SERC supports research on the effects of climatic and atmospheric change (particularly increases in the atmospheric CO₂) on major terrestrial ecosystems in the Southeastern United States. Work in this area should answer one of the following questions:

- What are the effects on terrestrial ecosystems, especially water use, of environmental change associated with energy production (see Sec. 2.2 above)?
- What are the effects of environmental change associated with energy production (see Sec. 2.2 above) on interactions between plants, insects, and plant diseases?

Goal 3: To develop and evaluate the tools needed to identify regional impacts of environmental change

The SERC supports development and testing of terrestrial ecosystem models needed for analysis of effects of environmental change associated with energy production on the region. The specific question of interest is:

- What are the effects of climatic and atmospheric change associated with energy production on forest ecosystems in the Southeast, including their water use?

When practical and logical, model testing efforts should use data from SERC-sponsored process studies for parameterization or validation.

The SERC does not anticipate funding a new project in support of this goal.

Goal 4: To evaluate effects of sulfur-based and/or carbon-based aerosols on earth's radiation balance.

The SERC will collaborate with the other regional centers to fund projects in the new NIGEC aerosol-climate interaction research initiative (see Sec. 2.4 for details).

3.6. The Western Regional Center (WESTGEC)

The Western Region consists of Alaska, Arizona, California, Hawaii, Idaho, Nevada, Oregon, Utah, and Washington as well as the Pacific territories.

3.6.1. WESTGEC Strategic Vision and Goals

WESTGEC's strategic vision emphasizes (1) understanding the mechanisms of carbon dynamics in terrestrial ecosystems, especially old-growth forests compared with younger-aged stands, and (2) quantifying potential

effects of environmental change associated with energy production on terrestrial ecosystems, with an emphasis on coniferous forests and semi-arid ecosystems.

WESTGEC goals are to (1) continue the support of the AmeriFlux research conducted in this region, and (2) study effects of environmental changes on terrestrial ecosystems. The primary focus of WESTGEC's current research program is on regional ecosystem response in relation to actual or potential environmental change and the socioeconomic implications of that response, using AmeriFlux and related data. Another significant element is to provide local to regional scale data on the flux of greenhouse gases (primarily CO₂) within important ecosystems of the region. A new focus will be to use field manipulations to study ecosystem responses to changing climate and CO₂ concentrations.

3.6.2. WESTGEC Specific Goals

Goal 1: To investigate carbon dynamics of important ecosystems within the region.

To address this issue, WESTGEC supports integrated research at existing AmeriFlux sites in the region, including sites in Washington, Oregon, and California. WESTGEC continues to encourage integrative regional research in these regions to understand impacts of changing land use, nutrient dynamics, pollution, and disturbance on terrestrial ecosystem carbon budgets. In order to estimate controls on productivity and net ecosystem exchange (NEE) of carbon the intent is to support research addressing processes controlling NEP and NEE, using modeling and direct measurements. Within this context, the following questions are key:

- What are the differences among terrestrial forested ecosystems of the Pacific Coast that interact with and affect the exchange of greenhouse gases between the landscape and the atmosphere?
This question is being addressed primarily at the Wind River Canopy Crane Research Facility's 500 year old-growth forest in Washington, and the Ponderosa Pine Forest, Oak Woodland, and Savanna sites in California.
- How does NEE or NEP differ among forest chronosequences in the region?

WESTGEC will not fund any new proposals in this area in FY 2005-2006.

Goal 2: To study effects of environmental change associated with energy production on terrestrial ecosystems.

WESTGEC is interested in research on effects of climatic change (not just present background climatic variability) on terrestrial ecosystems. Research on effects of environmental change on any important terrestrial ecosystem in the western region will be considered, but priority will be placed on sites where ongoing climate change research will synergistically contribute to WESTGEC studies, e.g., AmeriFlux sites and at the DOE Nevada Desert FACE Facility and the Mojave Global Change Facility, both located on the DOE Nevada test site (see http://www.unlv.edu/Climate_Change_Research/).

We encourage field manipulations that address ecosystem responses to changing climate and/or CO₂ concentrations, especially addressing the following questions:

- What are the important processes that regulate carbon dynamics and exchange in forest and semi-arid ecosystems?
- How important are rainfall and temperature in regulating the uptake of nutrients and subsequent gross and net productivity in terrestrial ecosystems?
- How important are belowground processes in regulating terrestrial ecosystem carbon exchange?

Depending on the availability of funds, WESTGEC may fund one or two new modest sized projects (\$50,000-\$100,000/year) in this area.

Goal 3: To evaluate effects of sulfur-based and/or carbon-based aerosols on earth's radiation balance.

The WESTGEC will collaborate with the other regional centers to fund projects in the new NIGEC aerosol-

climate interaction research initiative (see Sec. 2.4 for details).

4. Application Guidelines

4.1 Who is eligible to apply?

Research scientists associated with a U.S. university or not-for-profit organization with federally approved overhead rates are eligible to submit proposals in response to this request for proposals (RFP).

Researchers from national laboratories, federal agencies and for-profit organizations may participate under sole-source subcontracts. Normally, such subcontracts must be justified on the basis of the need for a unique capability of the subcontractor. The basis for this condition is that, except where there is such sole-source justification, national laboratories, federal agencies, and for-profit organizations cannot propose to perform work in competition with universities.

4.2 Designation of Principal Investigator

If the proposal lists more than one investigator, the first investigator listed on the cover sheet will be designated the "Principal Investigator." Each proposal can have only one Principal Investigator.

A Principal Investigator can submit only one proposal to NIGEC, and a Principal Investigator of an ongoing NIGEC project may not submit a new proposal to NIGEC as a Principal Investigator, except in the final year of his/her project.

4.3 Organizational Approvals

Proposals must carry the signatures of the persons authorized to make legally binding contractual commitments on behalf of the home institution of the principal investigator and any proposed subcontractors.

4.4 Proposals

Investigators who wish to apply for NIGEC funds to support work during the NIGEC fiscal year 2004-05 that begins on July 1, 2004, and ends on June 30, 2005, must submit proposals in response to this RFP.

New proposals may offer projects one to three years in duration and must include a separate budget for each year of the proposed activity. Continuation (Year 3) proposals must include a budget for the following year of the project.

Proposals will not be returned to the applicants.

5. Application Procedures

5.1 Letters of Intent for New Proposals due 16 July 2004

Prospective investigators submitting a new proposal are requested to submit a Letter of Intent by **16 July 2004** to the appropriate Regional Center Director. This letter is not required, but it is strongly recommended. The letter should include the names, areas of expertise, addresses, phone numbers, fax numbers and e-mail addresses of at least three reviewers who are qualified to review the proposal and whose participation as a reviewer of the proposal would not involve a conflict of interest. Candidate reviewers must have U.S. or Canadian addresses and phone numbers.

E-MAIL SUBMISSIONS ARE PREFERRED, but fax and US Mail are acceptable (see Regional Center Director contact information below).

Letters of intent are used for three purposes:

1. To facilitate feedback to potential Principal Investigators as to whether and how well the proposed work matches the goals of NIGEC. If a prospective Principal Investigator is uncertain about this match, a preliminary discussion of proposed work with the appropriate Regional Center Director is strongly encouraged before submitting a letter of intent.
2. To assist each Regional Center in developing a pool of reviewers with appropriate expertise.
3. To obtain information that can be used by NIGEC to facilitate the development of coherent research programs within and across the six regions.

Specific questions should be directed to the appropriate Regional Center Director.

5.2 Proposals DUE 27 August 2004

All proposals should be assembled in the following order: (See Appendix for forms and checklist).

1. Cover Sheet
Submit one cover sheet with original signatures for each participating institution (including subcontractors).
2. Summary Sheet
The first text item on the Project Summary Sheet (“Summarize in two to four sentences what activities...”) is especially important. It will serve as the basis for determining whether the application meets DOE research priorities. Follow instructions carefully.
3. Budget Summary
A budget summary is required for each year of requested funding for each participating institution (including subcontractors). New proposals requesting funding for more than one year must contain individual budget summaries for each year. Budget explanation sheets covering all line items in the summary sheets must be appended; again separate sheets for each year.

4. Text

- A. Restrictions and Suggestions on Text for New Proposals

Text for new proposals may not exceed ten single-spaced pages, using a ten-point font or larger. This ten-page limit includes all figures and tables, but does not include the cover sheet, summary sheet, budgets, bibliography of literature cited or biographical data. Multidisciplinary proposals for joint efforts may be fifteen pages in length with advance agreement from the appropriate Regional Center Director. The text should cover the following matters:

- Brief background of the research issue,
- The hypothesis to be tested or the question to be answered,
- The relevance to the regional center,
- A summary of results from previous NIGEC support, if applicable,
- The goals and methods of the proposed research,
- Specific tasks that the investigators will perform to accomplish the research goals,
- Deliverables and their due dates, and
- References listed in the format required by the American Geophysical Union. (See <http://www.agu.org/pubs/references.html>)

- B. Continuation Proposals

Third year continuation proposals should be written in a progress report format with 3-8 pages of text, not including figures, tables, and references. This report should include a brief summary of the scope of work proposed for the third year and the next-step questions (goals) for the following year (for any project not in its final year). Continuation proposals for third-year funding are reviewed for progress made on the project. Any substantive changes in the scope of work relative to the original proposal should be addressed in a

letter of request to the Regional Center Director describing, in detail, the reasons for the requested changes in the scope of work. This should be done in advance of submitting a continuation proposal. A determination will be made whether to continue the existing project with a revised scope of work or to request the submission of a proposal for a new project.

The format for third year continuation proposals is as follows:

- Specific goals for the implementation of third-year research,
- Research approach,
- Results of the previous year's questions already answered,
- Publications,
- Congressional district and current congressional representative,
- Biographical information pertaining to the principal and investigator and any co-investigator(s) (limited to two pages per individual), and
- Undergraduate, graduate, and postdoctoral students to be supported.

5. Other Support

The proposal must include a list of titles, support amount, and supporting agencies for projects currently underway or proposed that are related to the project described in this proposal.

5.3 Where to Submit Proposals?

Principal Investigators are encouraged, though not required, to submit proposals to the NIGEC Regional Center which contains the home institution of the Principal Investigator. In cases where the goals of the proposed research address a different NIGEC region, it is acceptable to submit the proposal to that Regional Center. Proposals for projects that address several geographic areas or the research goals of more than one NIGEC Regional Center should be submitted to a single (most appropriate) Regional Center. Questions should be directed to one of the Regional Center Directors. Addresses for regional centers are found on the last page of this document. Proposals under this RFP should not be submitted to the national office.

5.4 Number of proposal copies and deadline for receipt at the Regional Center offices?

Ten (10) copies of new proposals for new projects, or three copies for continuation proposals.

Include the original proposal (with all required signatures), as well as an electronic copy (send on disk or via email).

All of the above **MUST** be received at the regional center office by 5:00 p.m. on **27 August 2004**

6. Details of the Review Process and Selection Criteria

Proposals will receive written peer reviews, each of which will include a summary rating (excellent, very good, good, fair or poor). The Regional Center Directors will solicit these reviews by mail.

Reviewers will be asked to consider the following matters among others:

- Relationship of proposed project to the center's strategic vision and specific goals,
- Significance and originality,
- Adequacy of methodology,
- Competence of Principal Investigator and the research team,
- Coherence with related research,
- Results and publications related to prior NIGEC support, if any,
- Reasonableness of budget, and
- Availability of relevant resources and adequacy of the institutional facilities for performing the research.

Upon receipt of the written reviews, the director of the regional center will convene a Regional Scientific Advisory Committee. This committee will assist the Regional Center Director with integrating the results of the mail reviews. A selected subset of proposed projects will be combined into a "Regional Center Program" that is consistent with the NIGEC's and the center's strategic vision, and the specific Center's goals.

The Regional Center Director will then submit this regional center package to the NIGEC National Office. The Director of NIGEC will convene NIGEC's National Technical Advisory Committee (NTAC). NTAC's review will center on the integration and innovation of the overall regional center programs rather than on the quality and appropriateness of individual proposals. This committee will assist the director of NIGEC in achieving the strategic vision and the 2005-2006 specific goals in the implementation of new research for NIGEC.

Each proposal selected by each Regional Center will then be reviewed by DOE for relevance to criteria outlined in section 2 and to any other appropriate DOE programmatic issues. DOE then makes a final decision about each application that is put forward by the NIGEC National Office. According to the NIGEC Management Plan, the National Director will make the final decision on all proposals being funded.

7. Reporting Requirements

Annual progress reports and final reports will be required for each funded project.

8. Restrictions

No proposal should be submitted to more than one Regional Center for the same funding period.

9. Cost Accounting Periods and No-Cost Extension

Even though the scope of work may be projected for 2 or 3 years, funding will be granted on a per year basis. The PI's institution shall use **September 1 – August 31** as the cost accounting period. Each year's expenses will need to be kept financially separate.

If necessary, a one-time, no-cost extension of the expiration date of the award of up to 12 months following each year could be submitted, with appropriate justification, to the Regional Center Director by **May 15**.

NIGEC REGIONAL CENTERS



<p>Great Plains Regional Center at the University of Nebraska, Lincoln Shashi B. Verma, Director School of Natural Resource Sciences L.W. Chase Hall, Room 238 PO Box 830725 Lincoln, NE 68583-0725 Email: Svermal@unl.edu Phone: 402-472-0654 Fax: 402-472-6614</p>	<p>Southcentral Regional Center at Tulane University Efstathios (Stathis) Michaelides , Director NIGEC Southcentral Regional Center 605 Lindy Boggs Center New Orleans, LA 70118 Phone: 504-865-5250 Fax: 504-865-6745 Email: nigec@tcs.tulane.edu</p>
<p>Midwestern Regional Center at Indiana University J.C. Randolph, Director School of Public and Environmental Affairs 1315 East 10th Street Bloomington, IN 47405-1701 Phone: 812-855-4953 Fax: 812-855-7547 Email: randolph@indiana.edu</p>	<p>Southeast Regional Center at The University of Alabama, Tuscaloosa Robert A. Griffin Environmental Institute, Room 203 Bevill Research Bldg., Box 870207 (7th Ave.) Tuscaloosa, AL 35487-0207 Phone: 205-348-8401 Fax: 205-348-9659 Email: senigec@coe.eng.ua.edu</p>
<p>Northeast Regional Center at Harvard University Steven C. Wofsy, Director Dept. of Earth and Planetary Sciences 294 Pierce Hall, 29 Oxford St Cambridge, MA 02138-2901 Phone: 617-495-4566 Fax: 617-496-7247 Email: nigec@io.harvard.edu</p>	<p>Western Regional Center at University of California, Davis (WESTGEC) Susan L. Ustin, Director One Shields Ave. Davis, CA 95616 Phone: 530-752-7300 Fax: 530-752-7302 Email: westgec@ucdavis.edu</p>