

Program Announcement To DOE National Laboratories

LAB 00-12

Terrestrial Carbon Processes (TCP)

The Office of Biological and Environmental Research (OBER) of the Office of Science (SC), U.S. Department of Energy (DOE), hereby announces its interest in receiving proposals for research on Terrestrial Carbon Processes (TCP).

The general goal of TCP research is to advance the scientific understanding of terrestrial processes regulating carbon balance of ecosystems, and the role of ecosystems in the exchange of carbon dioxide (CO₂) between the atmosphere and terrestrial biosphere. Important endpoints of the research are to determine the capacity of ecosystems to store carbon, and estimate their influence on the rate of atmospheric CO₂ change. This research addresses the important global change issues of causes and rates of CO₂ change that may underlie climate change. In this context, the research is an important adjunct to policies and actions being considered for slowing the rise of greenhouse gases in the atmosphere. Interests and intents of TCP are to augment research on measurements, experiments and modeling of carbon processes. This Announcement solicits research on “terrestrial carbon processes” with primary emphasis on measurements needed to derive or estimate the net exchanges of CO₂ between the atmosphere and the terrestrial biosphere, and the acquisition of new knowledge about fundamental processes that regulate exchanges.

The intent of this Announcement is to strongly focus on field programs of measurement, experimental manipulation, and analysis of carbon processes; laboratory or controlled environment research is NOT encouraged. This is the third cycle of solicitations for refocused DOE research on terrestrial carbon that was formerly carried out on the global carbon cycle, and on the response of vegetation to CO₂. TCP is particularly interested in research activities that augment the existing AmeriFlux measurement program, including associated ecosystem level observations and experiments.

A central element of current TCP research is the AmeriFlux Program of measuring net CO₂ exchange, including the suite of core measurements that are needed for understanding intrinsic controls on carbon acquisition by ecosystems. The AmeriFlux Network of Sites and current Science Plan can be accessed from the web site: <http://cdiac.esd.ornl.gov/programs/ameriflux/>, which proposers are strongly advised to review. In general, the science questions of the current Science Plan continue to guide the AmeriFlux Program.

Progress of the AmeriFlux Program to date strongly suggests that the suites of CO₂ and biological measurements are providing unique estimates of Net Ecosystem Production (NEP), or the quantity of net annual carbon gain by the ecosystem. This is vital information for global carbon cycle analysis, and the results are providing important missing information needed to balance the global carbon budget. This solicitation seeks to continue and extend AmeriFlux research in the following ways:

1) By moderate expansion of the AmeriFlux Network to include additional geo-climatic zones, or ecological successional states, or biome types. If proposers are interested in forming new sites, the present distribution of research locations should be reviewed from the web sites, and then propose new locations that would significantly augment the existing Network. New sites will be considered only if they offer both compelling differences relative to existing ones in terms of unique geo-climatic zone or biome characteristics, and circumstances where NEP would be expected to be significant. New-site proposals must, of course, be based on representative stands of vegetation, and possess appropriate physical attributes amenable to producing quality net CO₂ exchange data. Proposals for new sites would identify the suite of measurements that would provide for a balance of CO₂ exchange data and independently derived estimates of NEP, that is by dimensional analysis, physiological measurements or other means. Either “natural” or “managed” ecosystems would be eligible sites.

2) By augmenting research at existing sites. Assistance will be provided to current Network sites to upgrade core measurement capabilities, with emphasis on acquisition of basic biological data needed to explain net CO₂ exchange results. It would be expected that augmented resources would provide improved measures of both CO₂ flux and associated biological processes. These proposals would be expected to describe current observations, explain what augmentations are needed in terms of either CO₂ flux or biological process measures that will significantly upgrade site core data bases, and explain the value the additional measurement capability would provide to the site and to the Network. Since the overall value of the AmeriFlux Network depends on data sharing and data inter-comparison, only those sites that have made data available to the AmeriFlux community through the network data system (CDIAC) will be eligible for augmentation awards.

3) By supporting supplemental research at existing sites. Purpose is to enhance overall quality of carbon process information at individual sites or for the AmeriFlux Network -- in contrast to item (2) above which simply upgrades core capabilities. Requests for support would be considered, for example, to: (a) improve micrometeorological characterization of the CO₂ exchange “footprint;” (b) obtain data that extend results from ecosystem to biome or regional scales (this could include aircraft flux measurements and limited support for modeling, for example;) (c) obtain isotopic data that pinpoints source and seasonality of CO₂ fluxes; (d) enhance data processing and prompt delivery of data to users; and (e) the analysis of exchanges and terrestrial carbon processes at larger scale.

Foci of these components of the solicitation are to enhance AmeriFlux science with emphasis on measurements, the development of comprehensive data sets for AmeriFlux sites, and the analysis of collateral results throughout the Network. Limited support of modeling for these purposes will be considered to the extent that analysis focuses on site and Network data sets.

Innovative proposals that develop new and cost effective research approaches which can be shown to clearly contribute to understanding terrestrial carbon processes, especially the quantification of NEP, and the scientific understanding of carbon sequestration by terrestrial ecosystems, will also be considered. Examples of innovative or exploratory ideas might include,

among other things, unique field experiments or manipulations of variables that regulate carbon balance, or the analysis of unique sets of data. Interest is in non-conventional approaches that offer potential for advancing both estimating carbon quantities and the scientific understanding of processes and controls. While these types of scientific studies may be linked to other on-going CO₂ carbon sequestration and carbon cycle research, they should clearly identify distinct and unique contributions – beyond already defined research of existing programs like AmeriFlux, Free Air CO₂ Enrichment (FACE) Experiments (<http://cdiac.esd.ornl.gov/programs/FACE/face.html>), and Carbon Sequestration (Program Announcement LAB 00-09, which closed March 2, 2000, http://www.sc.doe.gov/production/grants/LAB00_09.html).

Program Funding

It is anticipated that approximately \$2 million will be available for awards in Fiscal Year 2000, contingent upon availability of appropriated funds. Previous awards for this type of research have ranged from \$100,000 up to \$300,000 per year, with most not exceeding \$200,000. While most awards are expected to fall within this range, a few larger awards may be granted for coordinated activities across the Network, or that have requirements for unique field investigation. Any anticipated budgets exceeding \$300,000 per year per proposal should be discussed with the Program Manager. Funding of multiple year awards is expected, and is also contingent upon availability of appropriated funds.

DATES: The deadline for receipt of formal proposals is 4:30 p.m., E.D.T., April 27, 2000, to be accepted for merit review and to permit timely consideration for award in Fiscal Year 2000 and early Fiscal Year 2001.

ADDRESSES: Formal proposals referencing Program Announcement LAB 00-12, should be sent to: U.S. Department of Energy, Office of Science, Office of Biological and Environmental Research, Environmental Sciences Division, SC-74, 19901 Germantown Road, Germantown, MD 20874-1290, ATTN: Program Announcement LAB 00-12. This address must also be used when submitting proposals by U.S. Postal Service Express Mail or any other commercial overnight delivery service, or when hand-carried by the proposer.

FOR FURTHER INFORMATION CONTACT: Dr. Roger C. Dahlman, Environmental Sciences Division, SC-74, Office of Biological and Environmental Research, Office of Science, U.S. Department of Energy, 19901 Germantown Road, Germantown, MD 20874-1290, telephone: (301) 903-4951, E-mail: roger.dahlman@science.doe.gov, fax: (301) 903-8519.

Proposers are strongly encouraged to match their research proposals to terms of announcement scope, and preproposals therefore are not required. Brief questions for clarification can be addressed to Dr. Dahlman, Manager of Terrestrial Carbon Processes Research Program.

In addition to the original and seven copies of the proposal that must be submitted, the proposers are asked to submit an electronic copy of the abstract in ASCII format to karen.carlson@science.doe.gov. The abstract should include the following information: PI and

co-PI's, their institutions, brief summary of research, including identification of principal subcontractor/collaborators even if no funds are requested for their support.

The research project description must be 15 pages or less, exclusive of attachments and must contain an abstract or summary of the proposed research. Attachments include curriculum vitae, a listing of all current and pending federal support, and letters of intent when collaborations are part of the proposed research. Curriculum vitae should be submitted in a form similar to that of NIH or NSF (two to three pages), see for example:

<http://www.nsf.gov:80/bfa/cpo/gpg/fkit.htm#forms-9>.

The technical portion of the proposal should not exceed 20 double-spaced pages plus 5 pages for curriculum vitae and all other data, and should include a short one-half page abstract. Proposals that deviate from the terms of this Announcement will be returned, and will not be considered for support in the third cycle of TCP. Proposals received after the deadline will not be eligible for award in Fiscal Year 2000.

The instructions and format described below should be followed. Reference Program Announcement LAB 00-12 on all submissions and inquiries about this program.

**OFFICE OF SCIENCE
GUIDE FOR PREPARATION OF SCIENTIFIC/TECHNICAL PROPOSALS
TO BE SUBMITTED BY NATIONAL LABORATORIES**

Proposals from National Laboratories submitted to the Office of Science (SC) as a result of this program announcement will follow the Department of Energy Field Work Proposal process with additional information requested to allow for scientific/technical merit review. The following guidelines for content and format are intended to facilitate an understanding of the requirements necessary for SC to conduct a merit review of a proposal. Please follow the guidelines carefully, as deviations could be cause for declination of a proposal without merit review.

1. Evaluation Criteria

Proposals will be subjected to formal merit review (peer review) and will be evaluated against the following criteria which are listed in descending order of importance:

Scientific and/or technical merit of the project

Appropriateness of the proposed method or approach

Competency of the personnel and adequacy of the proposed resources

Reasonableness and appropriateness of the proposed budget

The evaluation will include program policy factors such as the relevance of the proposed research to the terms of the announcement, the uniqueness of the proposer's capabilities, and

demonstrated usefulness of the research for proposals in other DOE Program Offices as evidenced by a history of programmatic support directly related to the proposed work.

2. Summary of Proposal Contents

Field Work Proposal (FWP) Format (Reference DOE Order 5700.7C) (DOE ONLY)
Proposal Cover Page
Table of Contents
Abstract
Narrative
Literature Cited
Budget and Budget Explanation
Other support of investigators
Biographical Sketches
Description of facilities and resources
Appendix

2.1 Number of Copies to Submit

An original and seven copies of the formal proposal/FWP must be submitted.

3. Detailed Contents of the Proposal

Proposals must be readily legible, when photocopied, and must conform to the following three requirements: the height of the letters must be no smaller than 10 point with at least 2 points of spacing between lines (leading); the type density must average no more than 17 characters per inch; the margins must be at least one-half inch on all sides. Figures, charts, tables, figure legends, etc., may include type smaller than these requirements so long as they are still fully legible.

3.1 Field Work Proposal Format (Reference DOE Order 5700.7C) (DOE ONLY)

The Field Work Proposal (FWP) is to be prepared and submitted consistent with policies of the investigator's laboratory and the local DOE Operations Office. Additional information is also requested to allow for scientific/technical merit review.

Laboratories may submit proposals directly to the SC Program office listed above. A copy should also be provided to the appropriate DOE operations office.

3.2 Proposal Cover Page

The following proposal cover page information may be placed on plain paper. No form is required.

Title of proposed project
SC Program announcement title

Name of laboratory
Name of principal investigator (PI)
Position title of PI
Mailing address of PI
Telephone of PI
Fax number of PI
Electronic mail address of PI
Name of official signing for laboratory*
Title of official
Fax number of official
Telephone of official
Electronic mail address of official
Requested funding for each year; total request
Use of human subjects in proposed project:
 If activities involving human subjects are not planned at any time during the proposed project period, state "No"; otherwise state "Yes", provide the IRB Approval date and Assurance of Compliance Number and include all necessary information with the proposal should human subjects be involved.
Use of vertebrate animals in proposed project:
 If activities involving vertebrate animals are not planned at any time during this project, state "No"; otherwise state "Yes" and provide the IACUC Approval date and Animal Welfare Assurance number from NIH and include all necessary information with the proposal.
Signature of PI, date of signature
Signature of official, date of signature*

*The signature certifies that personnel and facilities are available as stated in the proposal, if the project is funded.

3.3 Table of Contents

Provide the initial page number for each of the sections of the proposal. Number pages consecutively at the bottom of each page throughout the proposal. Start each major section at the top of a new page. Do not use unnumbered pages and do not use suffices, such as 5a, 5b.

3.4 Abstract

Provide an abstract of no more than 250 words. Give the broad, long-term objectives and what the specific research proposed is intended to accomplish. State the hypotheses to be tested. Indicate how the proposed research addresses the SC scientific/technical area specifically described in this announcement.

3.5 Narrative

The narrative comprises the research plan for the project and is limited to 25 pages. It should contain the following subsections:

Background and Significance: Briefly sketch the background leading to the present proposal, critically evaluate existing knowledge, and specifically identify the gaps which the project is intended to fill. State concisely the importance of the research described in the proposal. Explain the relevance of the project to the research needs identified by the Office of Science. Include references to relevant published literature, both to work of the investigators and to work done by other researchers.

Preliminary Studies: Use this section to provide an account of any preliminary studies that may be pertinent to the proposal. Include any other information that will help to establish the experience and competence of the investigators to pursue the proposed project. References to appropriate publications and manuscripts submitted or accepted for publication may be included.

Research Design and Methods: Describe the research design and the procedures to be used to accomplish the specific aims of the project. Describe new techniques and methodologies and explain the advantages over existing techniques and methodologies. As part of this section, provide a tentative sequence or timetable for the project.

Subcontract or Consortium Arrangements: If any portion of the project described under "Research Design and Methods" is to be done in collaboration with another institution, provide information on the institution and why it is to do the specific component of the project. Further information on any such arrangements is to be given in the sections "Budget and Budget Explanation", "Biographical Sketches", and "Description of Facilities and Resources".

3.6 Literature Cited

List all references cited in the narrative. Limit citations to current literature relevant to the proposed research. Information about each reference should be sufficient for it to be located by a reviewer of the proposal.

3.7 Budget and Budget Explanation

A detailed budget is required for the entire project period, which normally will be three years, and for each fiscal year. It is preferred that DOE's budget page, Form 4620.1 be used for providing budget information*. Modifications of categories are permissible to comply with institutional practices, for example with regard to overhead costs.

A written justification of each budget item is to follow the budget pages. For personnel this should take the form of a one-sentence statement of the role of the person in the project. Provide a detailed justification of the need for each item of permanent equipment. Explain each of the other direct costs in sufficient detail for reviewers to be able to judge the appropriateness of the amount requested.

Further instructions regarding the budget are given in section 4 of this guide.

* Form 4620.1 is available at web site: <http://www.sc.doe.gov/production/grants/forms.html>

3.8 Other Support of Investigators

Other support is defined as all financial resources, whether Federal, non-Federal, commercial or institutional, available in direct support of an individual's research endeavors. Information on active and pending other support is required for all senior personnel, including investigators at collaborating institutions to be funded by a subcontract. For each item of other support, give the organization or agency, inclusive dates of the project or proposed project, annual funding, and level of effort devoted to the project.

3.9 Biographical Sketches

This information is required for senior personnel at the laboratory submitting the proposal and at all subcontracting institutions. The biographical sketch is limited to a maximum of two pages for each investigator.

3.10 Description of Facilities and Resources

Describe briefly the facilities to be used for the conduct of the proposed research. Indicate the performance sites and describe pertinent capabilities, including support facilities (such as machine shops) that will be used during the project. List the most important equipment items already available for the project and their pertinent capabilities. Include this information for each subcontracting institution, if any.

3.11 Appendix

Include collated sets of all appendix materials with each copy of the proposal. Do not use the appendix to circumvent the page limitations of the proposal. Information should be included that may not be easily accessible to a reviewer.

Reviewers are not required to consider information in the Appendix, only that in the body of the proposal. Reviewers may not have time to read extensive appendix materials with the same care as they will read the proposal proper.

The appendix may contain the following items: up to five publications, manuscripts (accepted for publication), abstracts, patents, or other printed materials directly relevant to this project, but not generally available to the scientific community; and letters from investigators at other institutions stating their agreement to participate in the project (do not include letters of endorsement of the project).

4. Detailed Instructions for the Budget (DOE Form 4620.1 "Budget Page" may be used)

4.1 Salaries and Wages

List the names of the principal investigator and other key personnel and the estimated number of person-months for which DOE funding is requested. Proposers should list the number of

postdoctoral associates and other professional positions included in the proposal and indicate the number of full-time-equivalent (FTE) person-months and rate of pay (hourly, monthly or annually). For graduate and undergraduate students and all other personnel categories such as secretarial, clerical, technical, etc., show the total number of people needed in each job title and total salaries needed. Salaries requested must be consistent with the institution's regular practices. The budget explanation should define concisely the role of each position in the overall project.

4.2 Equipment

DOE defines equipment as "an item of tangible personal property that has a useful life of more than two years and an acquisition cost of \$5000 or more." Special purpose equipment means equipment which is used only for research, scientific or other technical activities. Items of needed equipment should be individually listed by description and estimated cost, including tax, and adequately justified. Allowable items ordinarily will be limited to scientific equipment that is not already available for the conduct of the work. General purpose office equipment normally will not be considered eligible for support.

4.3 Domestic Travel

The type and extent of travel and its relation to the research should be specified. Funds may be requested for attendance at meetings and conferences, other travel associated with the work and subsistence. In order to qualify for support, attendance at meetings or conferences must enhance the investigator's capability to perform the research, plan extensions of it, or disseminate its results. Consultant's travel costs also may be requested.

4.4 Foreign Travel

Foreign travel is any travel outside Canada and the United States and its territories and possessions. Foreign travel may be approved only if it is directly related to project objectives.

4.5 Other Direct Costs

The budget should itemize other anticipated direct costs not included under the headings above, including materials and supplies, publication costs, computer services, and consultant services (which are discussed below). Other examples are: aircraft rental, space rental at research establishments away from the institution, minor building alterations, service charges, and fabrication of equipment or systems not available off-the-shelf. Reference books and periodicals may be charged to the project only if they are specifically related to the research.

a. Materials and Supplies

The budget should indicate in general terms the type of required expendable materials and supplies with their estimated costs. The breakdown should be more detailed when the cost is substantial.

b. Publication Costs/Page Charges

The budget may request funds for the costs of preparing and publishing the results of research, including costs of reports, reprints page charges, or other journal costs (except costs for prior or early publication), and necessary illustrations.

c. Consultant Services

Anticipated consultant services should be justified and information furnished on each individual's expertise, primary organizational affiliation, daily compensation rate and number of days expected service. Consultant's travel costs should be listed separately under travel in the budget.

d. Computer Services

The cost of computer services, including computer-based retrieval of scientific and technical information, may be requested. A justification based on the established computer service rates should be included.

e. Subcontracts

Subcontracts should be listed so that they can be properly evaluated. There should be an anticipated cost and an explanation of that cost for each subcontract. The total amount of each subcontract should also appear as a budget item.

4.6 Indirect Costs

Explain the basis for each overhead and indirect cost. Include the current rates.