

Office of Science
Notice DE-FG01-04ER04-12

Atmospheric Science Program

Department of Energy

Office of Science Financial Assistance Program Notice DE-FG01-04ER04-12; Atmospheric Science Program

AGENCY: U.S. Department of Energy

ACTION: Notice inviting grant applications.

SUMMARY: The Office of Biological and Environmental Research (BER) of the Office of Science (SC), U.S. Department of Energy (DOE), hereby announces its interest in receiving applications for research grants in experimental and theoretical studies of aerosol radiative forcing of climate in conjunction with the Atmospheric Science Program (ASP) as part of the U.S. Climate Change Science Program (CCSP). This notice requests new applications that are relevant to the terms of reference for this announcement and responsive to the particular needs defined below.

DATES: Formal applications submitted in response to this notice must be received by 4:30 p.m., Eastern Time, June 21, 2004, to be accepted for merit review and to permit timely consideration for award in Fiscal Year 2005. Awards are expected to begin on or about November 1, 2004.

ADDRESSES: Formal applications referencing Program Notice DE-FG01-04ER04-12 must be sent electronically by an authorized institutional business official through DOE's Industry Interactive Procurement System (IIPS) at: <http://e-center.doe.gov>. IIPS provides for the posting of solicitations and receipt of applications in a paperless environment via the Internet. In order to submit applications through IIPS your business official will need to register at the IIPS website. IIPS offers the option of using multiple files, please limit submissions to one volume and one file if possible, with a maximum of no more than four PDF files. The Office of Science will include attachments as part of this notice that provide the appropriate forms in PDF fillable format that are to be submitted through IIPS. Color images should be submitted in IIPS as a separate file in PDF format and identified as such. These images should be kept to a minimum due to the limitations of reproducing them. They should be numbered and referred to in the body of the technical scientific grant application as Color image 1, Color image 2, etc. Questions regarding the operation of IIPS may be e-mailed to the IIPS help desk at: HelpDesk@pr.doe.gov or you may call the help desk at (800) 683-0751. Further information on the use of IIPS by the Office of Science is available at: <http://www.science.doe.gov/production/grants/grants.html>.

If you are unable to submit an application through IIPS, please contact the Grants and Contracts Division, Office of Science at: (301) 903-5212 or (301) 903-3064, in order to gain assistance for

submission through IIPS or to receive special approval and instructions on how to submit printed applications.

FOR FURTHER INFORMATION CONTACT: Peter Lunn, Office of Biological and Environmental Research, Climate Change Research Division, SC-74, Germantown Building, U.S. Department of Energy, 1000 Independence Ave., SW, Washington, DC 20585-1290, telephone (301) 903-4819, fax (301) 903-8519, Internet e-mail address: peter.lunn@science.doe.gov. Program information is available at <http://www.science.doe.gov/ober/CCRD/atsi.html> and <http://www.atmos.anl.gov/ASP/>.

SUPPLEMENTARY INFORMATION:

Background: Two major scientific objectives of the Climate Change Research Division (CCRD) are: (1) to improve the performance of predictive models of the Earth's climate, and (2) to thereby make more accurate predictions of the response of the climate system to increasing concentrations of greenhouse gases.

The DOE Atmospheric Science Program (ASP) is a component of the U.S. Climate Change Science Program (CCSP). The objective of ASP is to provide and improve the scientific knowledge needed to simulate and predict radiative forcing by aerosols and their effects on climate. Understanding the role of aerosols in climate forcing is a critical factor in climate change assessment, as well as an essential element in advancing the state of the art in climate modeling. Aerosol forcing appears to be the same order of magnitude as the effect of greenhouse gases, but far more uncertain. The forcing has two major components, direct and indirect.

Direct effects of aerosols are the influence of the aerosols on the Earth's radiation balance due to the scattering and absorption of radiation by particles in clear (cloud-free) air. Indirect effects of aerosols include their influence on the radiation balance and hydrology through their impact on cloud microphysical properties (first indirect effect) and amount (second indirect effect). There is also a semi-direct effect, in which the heating by aerosol particles due to absorption of solar radiation decreases cloud amount.

The direct aerosol forcing is much better understood and quantified than the indirect forcing, especially forcing due to sulfate aerosols. Aerosol indirect effects have been demonstrated and quantified in numerous instances, but the indirect forcing is much more uncertain than the direct forcing.

ASP will focus on two areas of large uncertainty: (1) uncertainties associated with the loading, distribution, and fate of atmospheric aerosols, and their chemical and microphysical properties that affect the absorption and scattering of radiation, and (2) uncertainties associated with direct and indirect effects of aerosols on radiation and cloud properties. ASP will include examination of the amount, distribution, chemical and optical properties of carbonaceous aerosols (organic and elemental) in addition to inorganic aerosols (mainly sulfates and nitrates) associated with energy-related activities.

Both of these areas involve complex questions of atmospheric chemistry and physics as well as transport and transformation issues that need to be investigated in depth to improve the understanding of aerosol climate forcing and reduce uncertainties.

Request for Grant Applications

This notice requests applications for grants that address the ASP objective of providing and improving the scientific knowledge needed to simulate and predict radiative forcing by aerosols and their effects on climate. All applications submitted in response to this notice should explicitly state in the abstract which of the following functional and scientific categories or combinations of categories are being addressed. Please indicate for both functional and science categories which activities are the primary or secondary foci of the proposed work (a given project may have multiple foci). ASP will support only research that can be directly related to aerosol radiative forcing of climate.

Functional Categories:

1. Focused laboratory experiments
2. Field measurements
3. Fundamental theoretical and process modeling
4. Development of new instruments and methods to better measure the composition, optical, and cloud nucleating properties of atmospheric aerosols, in support of ASP laboratory experiments and field measurements

Science Categories:

1. Source of particles and gaseous precursors
2. Transport and/or transformation of particles and gaseous precursors
 - a. Local scale, < 100 km
 - b. Regional and greater scales, > 100 km
3. Concentrations of gas-phase aerosol precursors
4. Aerosol characterization
 - a. Optical properties
 - b. Size-distribution, number concentration
 - c. Humidity effects
 - d. CCN properties
 - e. Single particle composition
 - f. Physical and chemical characterization of carbonaceous particles
5. Transformations
 - a. Gas-phase transformations
 - b. Condensed-phase and surface transformations
 - c. Gas-to-particle conversion
 - d. New particle formation
 - e. Evolution of aerosol size and/or composition
 - f. Dynamics
 - g. Activation
 - h. Size distribution

- i. Precipitation development
 - j. In-cloud and below-cloud scavenging
6. Atmospheric radiation
7. Other (specify)

More detail on these research areas, including clarification of needs and priorities, is provided in the ASP Program Description available at <http://www.atmos.anl.gov/ASP/>.

All applications submitted in response to this Notice must explicitly state how the proposed research will support accomplishment of the BER Climate Change Research Division's (CCRD's) Long Term Measure of Scientific Advancement to deliver improved data and models to determine acceptable levels of greenhouse gases in the atmosphere.

Note that another DOE program, the Atmospheric Radiation Measurement (ARM) Program, also supports research on quantifying the effect of aerosols on the radiation field, by investigating both the direct role of aerosols on radiative transfer and the indirect role on cloud properties. Specifically ARM research relates observations of radiative fluxes and radiances to the atmospheric composition and uses these relations to develop and test parameterizations to accurately predict the atmospheric radiative properties. In contrast, the ASP will support aerosol research with emphasis on aerosol processes and resulting properties that would influence the radiation fields. ASP scientists will be encouraged to utilize pertinent ARM data and to participate in field campaigns associated with one or more of the three stationary ARM sites, and a mobile ARM facility. It is anticipated that the ARM mobile facility, currently under development, will at times be deployed in areas of interest specifically to ARM, at times in areas of interest specifically to ASP, and at times in areas of interest to both programs. It is anticipated that a joint ARM-ASP working group will be formed and collaborations between the two programs will be encouraged. Information about ARM can be found at <http://www.arm.gov/>.

The climate modeling community, as supported by DOE through the Climate Change Prediction Program, is a major client for the research to be conducted in ASP. It is thus essential that ASP research be tailored to the needs of the climate modeling community and that the program provide specific, measurable, and meaningful deliverables that are of use to the climate modeling community. It is anticipated that a joint ASP-CCPP working group will be formed. Information about CCPP can be found at <http://www.science.doe.gov/ober/CCRD/model.html>.

Given the close linkages between aerosols, air quality, and climate change, it is anticipated that ASP-funded scientists will be encouraged to participate in selected NARSTO field studies relevant to aerosol forcing. Information about NARSTO can be found at <http://www.cgenv.com/Narsto/>.

Funding for a project that requires a special field campaign, which has not already been planned and approved by the ASP Program Director, will be contingent on recommendation of the campaign by the ASP Science Steering Committee and final approval by the DOE Program Director. Once the ASP Science Team has been formed, plans for specific field studies will be developed and most ASP Science Team members will be expected to participate in the design, conduct, and/or interpretation of these field studies. For major ASP field campaigns, the program

will provide separate support for an aircraft platform and ground-based and air-borne instrumentation, e.g., measurements of relevant trace gas concentrations, particle size distributions, vertical and horizontal wind components, meteorological state parameters, and standard radiation measurements. Additionally, depending on the campaign, the aircraft may also be able to accommodate selected PI-based instruments. Required field measurements not provided separately by the program that are essential to the success of a proposed field study should be included in the proposed budget of the application.

To ensure that the program meets the broadest needs of the research community and the specific needs of the DOE CCRD, successful applicants are expected to participate as ASP Science Team members in the appropriate working group(s) relevant to their efforts. Costs for participation in ASP Science Team meetings and working group meetings should be included in the budget and be based on two trips of 4 days each to Washington, DC, and two trips of 3 days each to Chicago, Illinois, for each year of the project.

Program Funding

It is anticipated that approximately \$4 million will be available for awards in Fiscal Year 2005, contingent upon the availability of appropriated funds. Multiple-year funding of awards is expected, with out-year funding also contingent upon the availability of appropriated funds, progress of the research, and programmatic needs. The allocation of funds within the research areas will depend upon the number and quality of applications received. Awards are expected to begin on or about November 1, 2004. DOE is under no obligation to pay for any costs associated with the preparation or submission of applications if an award is not made.

Collaboration

Applicants are strongly encouraged to collaborate with researchers in other institutions, such as: universities, industry, non-profit organizations, federal laboratories and Federally Funded Research and Development Centers (FFRDCs), including the DOE National Laboratories, where appropriate, and to include cost sharing wherever feasible. Additional information on collaboration is available in the Application Guide for the Office of Science Financial Assistance Program that is available via the World Wide Web at: <http://www.sc.doe.gov/production/grants/Colab.html>.

Merit Review

Applications will be subjected to formal merit review (peer review) and will be evaluated against the following evaluation criteria which are listed in descending order of importance codified at 10 CFR 605.10(d):

1. Scientific and/or Technical Merit of the Project;
2. Appropriateness of the Proposed Method or Approach;
3. Competency of Applicant's Personnel and Adequacy of Proposed Resources;
4. Reasonableness and Appropriateness of the Proposed Budget.

The evaluation process will include program policy factors such as the relevance of the proposed research to the terms of the announcement and the agency's programmatic needs. Note that external peer reviewers are selected with regard to both their scientific expertise and the absence of conflict-of-interest issues. Both federal and non-federal reviewers will often be used, and submission of an application constitutes agreement that this is acceptable to the investigator(s) and the submitting institution.

The Application

Information about the development and submission of applications, eligibility, limitations, evaluation, selection process, and other policies and procedures may be found in the Application Guide for the Office of Science Financial Assistance Program and 10 CFR Part 605. Electronic access to SC's Financial Assistance Application Guide and required forms is made available via the World Wide Web: <http://www.sc.doe.gov/production/grants/grants.html>.

The technical portion of the application should not exceed twenty-five double-spaced pages. Applications should also include detailed budgets for each year of support requested. Applicants are asked to use the following ordered format:

- **Face Page** (DOE F 4650.2 (10-91))
In block 15, also provide the PI's phone number, fax number and e-mail address.
- **Project Abstract Page**; single page only, should contain title, PI name, functional and science categories, and abstract text
- **Budget pages** for each year and a budget summary of project period (using DOE F 4620.1)
- **Budget Explanation**
- **Technical Proposal (limited to 25 pages)**
 - **Project Description**
 - **Long Term Measure: All applications submitted in response to this Notice must explicitly state how the proposed research will support accomplishment of the BER Climate Change Research Division's (CCRD's) Long Term Measure of Scientific Advancement to deliver improved data and models for policy makers to determine acceptable levels of greenhouse gases in the atmosphere.**
 - **Literature Cited**
 - **Collaborative Arrangements** (if applicable)
- **Facilities and Resources**
- **Biographical Sketches, including list of recent relevant publications**, should be submitted in a form similar to that of NIH or NSF (two to three pages).
- **Current and Pending Support**
- **Letters of Collaboration** (if applicable)

For researchers who do not have access to the World Wide Web (WWW), please contact Karen Carlson, Office of Biological and Environmental Research, Climate Change Research Division, SC-74/Germantown Building, U.S. Department of Energy, 1000 Independence Ave., SW, Washington, DC 20585-1290, phone: (301) 903-3338, fax: (301) 903- 8519, e-mail:

karen.carlson@science.doe.gov; for hard copies of background material mentioned in this solicitation.

The Catalog of Federal Domestic Assistance number for this program is 81.049, and the solicitation control number is ERFAP 10 CFR Part 605.

Martin Rubinstein
Acting Director
Grants and Contracts Division
Office of Science

Posted on the Office of Science Grants and Contracts
Web Site May 4, 2004.