

## Office of Energy Research

### **Notice 96-11**

#### *Atmospheric Radiation Measurement (ARM) Program*

Department of Energy  
Office of Energy Research

Energy Research Financial Assistance Program Notice 96-11;  
Atmospheric Radiation Measurement (ARM) Program

AGENCY: U.S. Department of Energy (DOE)

ACTION: Notice inviting grant applications

**SUMMARY:** The Office of Health and Environmental Research (OHER) of the Office of Energy Research, U.S. Department of Energy (DOE), hereby announces its interest in receiving applications to support the experimental and theoretical study of radiation and clouds in conjunction with the Atmospheric Radiation Measurement (ARM) Program as part of the U.S. Global Change Research Program (USGCRP). The purpose of the ARM Program is to improve the treatment of radiation and clouds in the models used to predict future climate, particularly the General Circulation Models (GCMs). This notice requests applications for grants to support:

(Category 1): Continuation and enhancement of activities previously funded by DOE under Energy Research Financial Assistance Grant Program Notice No. 91-9 published in the Federal Register March 8, 1991, and Notice No. 93-14 published in the Federal Register April 1, 1993.

(Category 2): The modeling of clouds and radiation including aerosol effects for use in General Circulation Models (GCMs) and related models. Analysis of ARM and other data for refining, supporting, and validating model development are key aspects of research sought in this category. These activities should be closely tied to the analysis and use of data from the current and planned facilities at the three Cloud and Radiation Testbed sites: the first is centered near Lamont, Oklahoma; the second will have instruments first on the Island of Manus, Papua, New Guinea, and later on other islands or buoys in the Tropical Western Pacific; and the third site in the North Slope of Alaska region.

(Category 3): The development of new analytic methods and derived data products which combine ARM data and, if appropriate, other data such as satellite data to support the efforts of ARM Science Team members. Of high current interest are new algorithms and procedures that can be automated for the processing of ARM data streams. Successful applications will involve algorithms that take advantage of current or projected ARM instrumentation, or which will provide insight into new data streams of high credibility and useability to the ARM Science Team.

(Category 4): The development of advanced instrumentation for high accuracy/precision radiometric observations and for profiling of all three phases of water in the atmosphere and lower stratosphere. Short wave radiometry is of particular present interest.

(Category 5): The use of ARM data to support activities in other programs with goals related to those of ARM through unfunded participation in the ARM Science Team.

**DATES:** Formal applications submitted in response to this notice must be received by 4:30 PM, EST, May 16, 1996, to permit timely consideration for award in fiscal year 1997.

**ADDRESS:** Formal applications should be forwarded to: U.S. Department of Energy, Office of Energy Research, Grants and Contracts Division, ER-64, 19901 Germantown Road, Germantown, MD 20874-1290, ATTN: Program Notice 96-11. This address also must be used when submitting applications by U.S. Postal Service Express Mail, any commercial mail delivery service, or when handcarried by the applicant.

**FOR FURTHER INFORMATION CONTACT:** Dr. Patrick A. Crowley, Office of Health and Environmental Research, Environmental Sciences Division, ER-74, U.S. Department of Energy, 19901 Germantown Road, Germantown, Maryland 20874-1290. Telephone: (301) 903-3069, fax (301) 903-8519, or by Internet address, [p.crowley@oer.doe.gov](mailto:p.crowley@oer.doe.gov).

**SUPPLEMENTARY INFORMATION:** One of the major scientific objectives of the Environmental Sciences Division (ESD) is to improve the performance of predictive models of the Earth's climate and to thereby make predictions of the response of the climate system to increasing concentrations of greenhouse gases. This program is one element of a major effort to improve the quality of current models and to support the development of sets of climate models capable of making regional prediction of climate and climate change. The major component of the ARM Program is an experimental testbed for the study of models of the terrestrial radiation field, properties of clouds, the full life cycle of clouds, and the incorporation of these process-level models into climate models. This testbed is referred to as the Cloud and Radiation Testbed (CART). The first ARM CART site began operation in calendar year 1992, with instruments spread over an area of approximately 60,000 sq. km., centered on Lamont, Oklahoma. The Tropical Western Pacific (TWP) site will consist initially of island-based suites of instrumentation focused on cloud and radiative properties in the tropical ocean environment. The first of the TWP Atmospheric Radiation and Clouds Stations (ARCS) will be operating by the end of calendar year 1996 on the island of Manus, Papua New Guinea, and the second on Nauru in 1997. Instrumentation more representative of the CART site in Oklahoma will be deployed to the vicinity of Point Barrow, on the North Slope of Alaska late in 1997 or early 1998.

To ensure that the program meets the broadest needs of the research community and the specific needs of the DOE, ESD, successful applicants will participate as ARM Science Team members along with selected scientists from other ESD programs that relate to the ARM Program. Costs for participation in ARM Science Team meetings and subcommittee meetings should be based on two trips of 1 week each to Washington, D.C., and two trips of 3 days each to Chicago, Illinois.

Successful applicants for continuation or enhancement of previously awarded grants, Category 1, will demonstrate (a) continued relevance of their work to the goals of the ARM Program; (b) the quality and relevance of work conducted under previous support to the goals of the ARM Program, including a listing of publications and presentations; and (c) relevant contribution to the development of the ARM program, particularly the design and development of CART facilities, as a result of previous funding. Applications should include a special section covering items (b) and (c) entitled "Accomplishments Under Previous Support."

Successful applicants for grants in support of Category 2 will demonstrate the role of their research in the improvement of GCMs and/or related models and delineate the path that their results will take to make those improvements. Successful applicants will be involved in one or more of three activities: (a) the development of models and parameterization of radiative transfer or cloud processes, including aerosol effects, or the testing of these models in GCMs or process-level models; (b) experimental studies at CART facilities to test elements of models and their performance or to obtain key laboratory data; or (c) the analysis of existing data, including field data and satellite data, to support model development or testing.

Successful applicants for participation in Category 3, the development of new analytic methods and derived data products, will demonstrate how the proposed efforts support the ARM Science Team members involved in the other categories of research. Applications in this area must recognize that the program has a developed infrastructure for data treatment and distribution. The support looked for in this area involves a deeper more sophisticated algorithmic approach than presently in use. The successful applications will accent a strong scientific approach to the problem of data fusion.

Because ARM is well into its intended life cycle, successful applicant for participation in the ARM instrument development program, Category 4, will meet either (1) immediate and near-term needs of the ARM Program for improved radiometric sensors, both broad-band and spectrally resolved or for instruments capable of high-precision radiometric calibration, or (2) immediate and near-term needs of the ARM Program for improved systems for the measurement of the spatial distribution of all three phases of water, with particular emphasis on vertical profiles. In each case the application should contain, in appropriate detail, a discussion of the accuracy and precision of the proposed measurement methodology as a function of wavelength or altitude respectively, and the relevance of the proposed measurements to test models of atmospheric radiative processes. It has been suggested that the data available from the array of instruments planned or in place in the program suffer from too little short wave data. Applications which address this concern in the near term are anticipated to be of high interest.

Successful applicants for participation in the adjunct ARM Science Team, Category 5, will apply ARM data to research programs of interest to DOE and related to ARM goals, but which are funded by other sources. While ARM data is available through the ARM Data Archive at Oak Ridge National Laboratory, ARM Science Team participation provides investigators the opportunity to receive tailored data products from the ARM Experiment Center at Pacific Northwest Laboratory and the opportunity to participate in the design of ARM facilities and experiments. While there will not be funds to support the research of applicants under this portion of this notice, some funds may be available to support the travel of successful applicants

to participate in ARM Science Team activities as indicated below. Preference will be given to participants whose goals are related to the general goals of ARM outlined above; Global Energy and Water Experiment (GEWEX) and its associated programs; the study of aerosols and their effect on the radiative transfer, including visibility studies; and the transfer of UV-B radiation through the atmosphere.

The efforts proposed in support of all five categories should have as a focus the conduct of research using the CART facilities either in operation or being developed for ARM. Successful applicants will participate in the continuing development of the detailed experimental approaches for CART and guide the evolving development and acquisition of the experimental equipment.

It is anticipated that approximately \$5,000,000 will be available for awards for the combined activity under Categories 1, 2, 3, and 4 above in fiscal year 1997, contingent upon availability of appropriate funds. Multiple year funding of awards is expected, also contingent upon availability of funds. The allocation of funds among the three categories above will depend on the number and quality of the applications received. It is anticipated that a substantial fraction of the funds will support continuation of existing research under Category 1 above. Typical ESD awards are \$200,000 per year, but range from \$50,000 to \$600,000.

Information about development, submission, and the selection process, and other policies and procedures may be found in 10 CFR Part 605, and in the Application Guide for the Office of Energy Research Financial Assistance Program. The Application Guide is available from the U.S. Department of Energy, Office of Health and Environmental Research, Environmental Sciences Division, ER-74, 19901 Germantown Road, Germantown, Maryland 20874-1290. Telephone requests may be made by calling (301) 903-4902. Electronic access to ER's Financial Assistance Guide is possible via the Internet using the following e-mail address:  
<http://www.er.doe.gov/>

Collaborative applications are encouraged. Awards are anticipated to begin on or about November 1, 1996.

The technical portion of the application should not exceed twenty-five (25) doubled-spaced pages. For applicants under Category 4 above, the "Accomplishments Under Previous Support" section should not exceed ten (10) additional double-spaced pages. An abstract of less than 200 words must be included with the application. Lengthy appendices are discouraged.

Technical information on the ARM Program is available from the ARM Program Office at Pacific Northwest Laboratory, P.O. Box 999, Richland, WA 99352, telephone (509) 375-6964, or from the Office of Scientific and Technical Information, P.O. Box 62, Oak Ridge, TN 37831, telephone (615) 576-8401. The Catalog of Federal Domestic Assistance Number for this program is 81.049, and the solicitation control number is ERFAP 10 CFR part 605.

Issued in Washington, D.C.

John Rodney Clark  
Associate Director

for Resource Management  
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Published in the Federal Register February 23, 1996, Vol. 61, No. 37,  
pages 6986-6988.