

[Office of Energy Research](#)

Notice 97-16
Climate Change Prediction Program

Department of Energy
Office of Energy Research

Energy Research Financial Assistance Program Notice 97-16; Climate Change Prediction Program

AGENCY: U.S. Department of Energy

ACTION: Notice inviting grant applications

SUMMARY: The Office of Health and Environmental Research (OHER) of the Office of Energy Research (ER), U.S. Department of Energy (DOE), hereby announces its interest in receiving applications to support the development of decadal to multi-century climate prediction in conjunction with the Climate Change Prediction Program, a part of the U.S. Global Change Research Program (USGCRP).

DATES: Applicants are encouraged (but not required) to submit a brief preapplication for programmatic review. There is no deadline for the preapplication, but early submission of preapplications is encouraged to allow time for meaningful discussions. Formal applications submitted in response to this notice must be received by 4:30 p.m., EDT, August 5, 1997, to permit timely consideration for award in Fiscal Year 1998.

ADDRESSES: Preapplications referencing Program Notice 97-16 may be sent to one of the program contacts at the following address: Office of Health and Environmental Research, Environmental Sciences Division, ER-74, U.S. Department of Energy, 19901 Germantown Road, Germantown, MD 20874-1290 . Formal applications referencing Program Notice 97-16 should be forwarded to: U.S. Department of Energy, Office of Energy Research, Grants and Contract Division, ER-64, 19901 Germantown Road, Germantown, MD 20874-1290, ATTN: Program Notice 97-16. This address also must be used when submitting applications by U.S. Postal Service Express Mail, any commercial mail delivery service, or when hand-carried by the applicant. An original and seven copies of the application must be submitted; however, applicants are requested not to submit multiple application copies using more than one delivery or mail service.

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, MD 20874-1290, telephone (301) 903-3069, fax (301) 903-8519, Internet e-mail address: p.crowley@oer.doe.gov. or Dr. Wanda Ferrell, Office of Health and Environmental Research, Environmental Sciences Division, ER-74, U.S. Department

of Energy, 19901 Germantown Road, Germantown, MD 20874-1290, telephone (301) 903-0043, fax (301) 903-8519, Internet e-mail address: wanda.ferrell@oer.doe.gov. Program information is available on the DOE/OHER WWW site using the URL http://www.er.doe.gov/production/oher/ESD_top.html.

SUPPLEMENTARY INFORMATION: This notice requests applications for grants to support the following five efforts:

- (1) Continuation and enhancement of activities previously funded by DOE under the auspices of the Carbon Dioxide Research Program climate research program element and the Computer Hardware, Advanced Mathematics and Model Physics (CHAMMP) climate model development program.
- (2) Theoretical limits to climate prediction over decade to multi-century time frames with subcontinental and smaller scale spatial accuracy.
- (3) The development of improved mathematical techniques, model formulations and computer algorithms for atmosphere, ocean and coupled atmosphere-ocean general circulation models (GCM) that more accurately and efficiently describe and predict global climate system behavior on the time and space scales mentioned above using advanced, parallel-processing scientific supercomputers.
- (4) The development of improved representations of key climate processes (surface processes, convective transport, etc) that accurately simulate these processes on the appropriate scales used in GCM-based climate models that simulate decade-to-century climate change.
- (5) The development and analysis of long-term, observation based climate data sets that can be used to test the ability of GCM-based climate models to realistically simulate and predict climate system behavior on the above-mentioned time and space scales. The data sets should be developed from existing observational data bases and not require the collection of further measurements.

Accurate prediction of climate change on decadal and longer time scales is a major scientific objective of the Environmental Sciences Division (ESD). The DOE Climate Change Prediction Program is the next phase in the evolution of DOE's long-standing climate modeling and simulation research agenda. It was developed from the integration of the Computer Hardware, Advanced Mathematics and Model Physics (CHAMMP) climate model development program with the CO₂ Research Program climate research program element. The program is focused on developing, testing and applying climate simulation and prediction models that stay at the leading edge of scientific knowledge and computational technology. A unique feature of the program is the establishment of a distributed modeling center involving DOE National Laboratories, the National Center for Atmospheric Research and the non-Federal research community. The program will develop models based on more definitive theoretical foundations and improved computational methods that will run efficiently on future generations of high-performance scientific supercomputers. The intent is to increase dramatically both the accuracy

and throughput of computer model-based predictions of future climate system response to the increased atmospheric concentrations of greenhouse gases.

To ensure that the program meets the broadest needs of the research community and the specific needs of ESD, the successful applicants will participate as members of the Climate Change Prediction Program Science Team along with selected scientists from related ESD programs. Costs for the participation in Science Team meetings and workshops should be included in the respondent's application. Yearly estimates for Science Team travel should be based on one trip of five days to Washington, DC, one trip of five days to San Francisco, CA, and one trip of five days to Denver, CO.

Successful applicants for continuation or enhancement of previously-awarded grants will demonstrate (a) the continued relevance of their work to the goal of advancing the science of decade-to-multi-century climate prediction; (b) the quality and relevance of work conducted under previous support to this goal, including a listing of publications and presentations; and (c) relevant contributions to the development of DOE CHAMMP and Climate Modeling programs, including participation in the organization of meetings and workshops and collaborations with other DOE investigators. Applicants should include a special section entitled "Accomplishments Under Previous Support," which addresses items (b) and (c) discussed in this paragraph. Applicants should be prepared to provide, on short notice, complete copies of all publications, reports, etc. listed in this section, should they be required for the review process.

Successful applicants for grants exploring the theoretical limits of climate prediction will conduct studies of the climate system to ascertain the capability for computer based climate simulation models to predict the aspects of the climate system that influence near-surface temperature, precipitation and winds, decades to centuries in the future. These studies may include, but are not limited to, analytical and modeling investigations of the coupled climate system, or components of the climate system, to identify climate dynamical mechanisms that influence long-term variability and predictability over continental and subcontinental spatial scales.

Successful applicants for developing new mathematical techniques and numerical algorithms will target their research toward methods that can be incorporated into models running on highly parallel scientific supercomputers capable of performing over 1011 floating-point operations per second (100 giga-FLOPS) in climate modeling simulations. Applicants must demonstrate the role of their research in improving the accuracy and/or computational efficiency of GCM-based climate simulation models of the type envisioned for use in making forecasts of long-term climate change. These methods may be used in the simulation of any or all of the climate system processes modeled in a GCM, including, but not limited to, atmospheric and ocean dynamics and transport, surface energy and mass exchange, atmospheric radiative transfer, ocean convection, and sea-ice dynamics and thermodynamics. Applicants in this area must include a plan for the dissemination of any developed model code, and necessary documentation, to the climate modeling community.

Successful applicants developing or improving representations of climate system processes for inclusion in GCM-based climate prediction models will conduct research to more accurately

describe these processes and their interaction with other aspects of the simulated climate system. These studies will explore methods for incorporating the results of the U.S. Global Change Research Program's observational and experimental programs into model components that accurately describe climate system processes at the model resolution scales typically used for decade-to-multi-century climate prediction. Applicants in this area must include a plan for the dissemination of any developed model code, and necessary documentation, to the climate modeling community.

Successful applicants developing model diagnostic data sets will analyze existing observational data bases to develop time dependent records of climate variability and climate change that can be used as tests for climate change predictions. Analysis of the data should include consideration of the climate dynamical processes that led to the temporal and spatial variability in the record. Especially important is the development of diagnostic data sets that can be used to test model predictions of long-term changes the near-surface temperature, precipitation and wind climatologies over continental and sub-continental spatial scales. Applicants in this area must include a plan to allow the inexpensive dissemination of the diagnostic data sets in a standard digital format.

It is anticipated that approximately \$3,000,000 will be available for awards in Fiscal Year 1998, 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. It is anticipated that a substantial fraction of the funds will support continuation of existing research. Typical awards in this area are \$200,000 per year, but range from \$50,000 to \$600,000. The technical portion of the application should not exceed twenty-five (25) double-spaced pages and should include detailed budgets for each year of support requested. For applications requesting continuation or enhancements to previously awarded grants, the "Accomplishments Under Previous Support " section should not exceed ten (10) additional double-spaced pages. An abstract of 200 words or less must be included with the application. Lengthy appendices are discouraged. Collaborative applications are encouraged. Awards are expected to begin on or about December 1, 1997.

Potential applicants are strongly encouraged to submit a brief preapplication that consists of two to three pages of narrative describing the research project objectives and methods of accomplishment. These will be reviewed relative to the scope and research needs of the DOE's Climate Change Prediction Program. Principal investigator address, telephone number, fax number and e-mail address are required parts of the preapplication. A response to each preapplication discussing the potential program relevance of a formal application generally will be communicated within 30 days of receipt. ER's preapplication policy can be found on ER's Grants and Contracts Web Site at: <http://www.er.doe.gov/production/grants/preapp.html>.

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 will include program policy factors such as the relevance of the proposed research to the terms of the announcement and an agency's programmatic needs. Note, external peer reviewers are selected with regard to both their scientific expertise and the absence of conflict-of-interest issues. 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.

To provide a consistent format for the submission, review and solicitation of grant applications submitted under this notice, the preparation and submission of grant applications must follow the guidelines given in the Application Guide for the Office of Energy Research Financial Assistance Program 10 CFR Part 605. Applicants are strongly encouraged to access ER's Financial Assistance Application Guide via the World Wide Web at: <http://www.er.doe.gov/production/grants/grants.html>. A limited number of paper copies of the Application Guide are available and may be obtained from Ms. Karen Carlson, U.S. Department of Energy, Office of Health and Environmental Research, Environmental Sciences Division, ER-74, 19901 Germantown Road, Germantown, MD 20874. Telephone request may be made by calling (301) 903-3338 or by Internet e-mail to karen.carlson@oer.doe.gov.

Technical information on the CHAMMP and Climate Modeling Programs is available on the WWW at the URL http://www.er.doe.gov/production/oher/GC/ESD_gc.html or from the Office of Scientific and Technical Information, P.O. Box 62, Oak Ridge, TN 37831, telephone (423) 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.

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Published in the Federal Register May 27, 1997, Vol. 62, No. 101, pages 28686-28688.