

**Office of Science
Financial Assistance
Funding Opportunity Announcement
DE-FOA-0000242**

***Regional and Global Climate
Modeling Program:
Modes of Low Frequency Variability in a Changing Climate***

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 on the topic of Modes of Low Frequency Variability in a Changing Climate under the Regional and Global Climate Modeling (RGCM) program.

Simulation of global and large-scale features of climate change has improved considerably over the past decade; nevertheless climate and earth system models do not yet accurately simulate major modes of low frequency climate variability, e.g., the Pacific Decadal Variability (PDV), Atlantic Multidecadal Oscillation (AMO), and the North Atlantic Oscillation. How natural climate variability interacts and modulates future climate change is a topic of intense debate in the research community.

High risk, high pay-off research ideas that explore innovative new directions that further the understanding of the modes of low frequency variability are encouraged; they should clearly describe how the proposed ideas have the potential to lead to breakthroughs in modeling of climate at global and regional scales. The BER strategy for basic research in climate science is described in a recent strategic plan <http://www.sc.doe.gov/ober/Climate%20Strategic%20Plan.pdf>. BER encourages potential applicants to review this plan to familiarize themselves with the program and its strategic goals.

PREAPPLICATIONS

Potential applicants are required to submit a three-page preapplication by email to renu.joseph@science.doe.gov. Preapplications must be received by DOE by **4:30 p.m., Eastern Time, February 18, 2010** (preapplications received after this date will not be considered). The subject line of the email should be: "RGCM: Modes of Low Frequency Variability in a Changing Climate". The preapplication should be a single PDF file attached to the email and should have 1 inch margins when printed. No FAX or mail submission of preapplications will be accepted.

The first page should include: the project title, the Lead Principal Investigator's (PI) name and complete contact information, and a table listing the Lead PI and institution and all funded Co-PIs, their institutions and the amount of funding requested for each year for the project for each

funded investigator. Preapplications should describe the research objectives, the technical approach(s), and the proposed team members and their expertise relevant to the proposed research.

The intent in requesting a preapplication is to save the time and effort of applicants in preparing and submitting a formal project application that may be inappropriate for the program. Preapplications will be reviewed relative to the scope and research needs as outlined in the TECHNICAL WRITE-UP and in SUPPLEMENTARY INFORMATION. Preapplicants will be notified by email if a formal application is encouraged by **March 1, 2010** (hence, the preapplication should be sent from the email address that will be monitored for the response). Applicants who have not received a response regarding the status of their preapplication by this date are responsible for contacting the program to confirm this status. Notification of a successful preapplication is not a guarantee that an award will be made in response to a formal application. Formal applications will be accepted only from preapplicants encouraged to submit a formal application.

APPLICATION DUE DATE: April 12, 2010, 11:59 p.m. Eastern Time

Formal applications submitted in response to this FOA must be received by April 12, 2010, 11:59 p.m. Eastern time, to permit timely consideration of awards. **APPLICATIONS RECEIVED AFTER THE DEADLINE WILL NOT BE REVIEWED OR CONSIDERED FOR AWARD.**

IMPORTANT SUBMISSION INFORMATION:

The full text of the Funding Opportunity Announcement (FOA) is located on FedConnect. Instructions for completing the Grant Application Package are contained in the full text of the FOA which can be obtained at: <https://www.fedconnect.net/FedConnect/?doc=DE-FOA-0000242&agency=DOE>. To search for the FOA in FedConnect click on “Search Public Opportunities”. Under “Search Criteria”, select “Advanced Options”, enter a portion of the title “Regional and Global Climate Modeling Program: Modes of Low Frequency Variability in a Changing Climate”, then click on “Search”. Once the screen comes up, locate the appropriate Announcement.

In order to be considered for award, Applicants must follow the instructions contained in the Funding Opportunity Announcement.

WHERE TO SUBMIT: Applications must be submitted through Grants.gov to be considered for award.

You cannot submit an application through Grants.gov unless you are registered. Please read the registration requirements carefully and start the process immediately. Remember you have to update your CCR registration annually. If you have any questions about your registration, you should contact the Grants.gov Helpdesk at 1-800-518-4726 to verify that you are still registered in Grants.gov.

Registration Requirements: There are several one-time actions you must complete in order to submit an application through Grants.gov (e.g., obtain a Dun and Bradstreet Data Universal Numbering System (DUNS) number, register with the Central Contract Registry (CCR), register with the credential provider, and register with Grants.gov). See <http://www.grants.gov/GetStarted>. Use the Grants.gov Organization Registration Checklist at <http://www.grants.gov/assets/OrganizationRegCheck.pdf> to guide you through the process.

Designating an E-Business Point of Contact (EBiz POC) and obtaining a special password called an MPIN are important steps in the CCR registration process. Applicants, who are not registered with CCR and Grants.gov, should allow at least 21 days to complete these requirements. It is suggested that the process be started as soon as possible.

IMPORTANT NOTICE TO POTENTIAL APPLICANTS: When you have completed the process, you should call the Grants.gov Helpdesk at 1-800-518-4726 to verify that you have completed the final step (i.e. Grants.gov registration).

Questions: Questions relating to the registration process, system requirements, how an application form works, or the submittal process must be directed to Grants.gov at 1-800-518-4726 or support@grants.gov. Part VII of the FOA explains how to submit other questions to the Department of Energy (DOE).

All applications should be in a single PDF file.

GENERAL INQUIRIES ABOUT THIS FOA SHOULD BE DIRECTED TO:

Technical/Scientific Program Contact:

Program Manager: Dr. Renu Joseph
Regional and Global Climate Modeling
Climate and Environmental Sciences Division
Office of Biological and Environmental Research
U. S. Department of Energy
Phone: 301-903-9237
E-Mail: Renu.Joseph@science.doe.gov

SUPPLEMENTARY INFORMATION:

BER's climate science activity has established the following Long Term Measure (LTM) for its programs: *Deliver improved scientific data and models about the potential response of the Earth's climate and terrestrial biosphere to increased greenhouse gas levels for policy makers to determine safe levels of greenhouse gases in the atmosphere.* The RGCM program supports this LTM by undertaking scientific studies using state-of-the-science coupled-climate and Earth system models, with a focus on analyzing climate variability and climate change projections and providing a pathway to improve the coupled models. The temporal scales of interest in the program range from decadal to centennial.

To accelerate progress in the field, DOE is requesting applications that address one or more of the following areas:

- 1) Interaction of Climate Change and Low Frequency Modes of Natural Climate Variability:** Low frequency modes of variability (ranging from interannual to multi-decadal) are important because many of these modes have teleconnections that have broad implications on global climate. Activities that focus on the identification, evaluation, and understanding of low frequency modes, (e.g., ENSO, PDV, and AMO) and how these may change in a changing climate, as evidenced in coupled model simulations, are encouraged under this Funding Opportunity Announcement (FOA). Use of multi-model ensembles is encouraged as are sensitivity studies involving state-of-the-science coupled climate and Earth system models and/or regional climate models.

- 2) Simulation of Climate Extremes under a Changing Climate:** Extreme events have large societal impacts. Applications that focus on understanding and simulating processes that influence the statistics of extreme events (e.g., modulation of statistics due to the phase of natural modes of variability) are solicited. The use of multi-model ensembles and/or innovative use of existing mathematical and statistical tools to analyze extreme event statistics are encouraged. The aim of this research is to better quantify the frequency, duration, and intensity of extreme events under climate change and elucidate the role of low frequency climate variability in modulating extremes.

- 3) Reliability of Climate Change Projections:** Though coupled-climate and earth system models have improved the ability to reproduce observed climate, there has been little change to the wide range of sensitivities exhibited by different models. Currently a new set of coordinated experiments is being undertaken by various international modeling centers. The results of these will constitute the Coupled Model Intercomparison Project Phase 5 (CMIP5; <http://cmip-pcmdi.llnl.gov/cmip5/>) data base. Quantification of uncertainties that help in the assessment of climate change projections is solicited as part of this FOA. The following topics are particularly encouraged: robust techniques for discarding or including certain model simulations, and theoretical understanding leading to increased reliability of climate change projections.

All applications submitted in response to this FOA must explicitly state how the proposed project will support accomplishment of the BER climate science activity Long Term Measure (LTM): "Deliver improved scientific data and models about the potential response of the Earth's climate and terrestrial biosphere to increased greenhouse gas levels for policy makers to determine safe levels of greenhouse gases in the atmosphere."

Proposed projects that would integrate across DOE/BER research programs to build on DOE investments in climate change research as well as current capabilities in the DOE National Laboratories are particularly encouraged.

To ensure that the RGCM Program meets both the broad needs of the climate modeling research community and the specific needs of the Climate and Environmental Sciences Division, successful applicants will participate in the annual science team meeting. Costs for participation

in Science Team annual meetings and workshops should be included in each application. Yearly estimates for Science Team travel should be based on one trip of five days to Washington, DC.

It is anticipated that successful PIs will obtain computing resources at various DOE National Laboratories to achieve the proposed scientific objectives, e.g., through proposals to the National Energy Research Scientific Computing (NERSC, <http://www.nersc.gov/>), and Leadership Computing Facility.

Proposed research is intended to fill critical knowledge gaps, including the exploration of some high-risk approaches. BER also encourages the submission of innovative "high-risk" applications with potential for future high impact on modes of low frequency variability in a changing climate. The probability of success and the risk-reward balance will be considered when making funding decisions.

DATA SHARING POLICY:

Research data obtained through public funding are a public trust. As such, these data must be publicly accessible. To be in compliance with the data policy of the U.S. Global Change Research Program of full and open access to global change research data, applications submitted in response to this FOA must include a description of the applicant's data sharing plans if the proposed research involves the acquisition of data in the course of the research that would be of use to the climate change research and assessment communities. This includes data from extensive, long-term observations and experiments and from long-term model simulations of climate that would be costly to duplicate. The description must include plans for sharing the data that are to be acquired in the course of the proposed research, particularly how the acquired data will be preserved, documented, and quality assured, and where they will be archived for access by others. Data of potentially broad use in climate change research and assessments should be archived, when possible, in data repositories for subsequent dissemination. Examples of DOE-funded data repositories may be found at <http://cdiac.ornl.gov/> and http://www-pcmdi.llnl.gov/ipcc/about_ipcc.php. The repository where the applicant intends to archive the data should be notified in advance of the intention, contingent on a successful outcome of the application review. If data are to be archived at the applicant's home institution or in some other location, the application must describe how, where, and for how long the data will be documented and archived for access by others. Applicants are allowed an initial period of exclusive use of the acquired data to quality assure it and to publish papers based on the data, but they are strongly encouraged to make the data openly available as soon as possible after this period. DOE's Office of Biological and Environmental Research defines the exclusive use period to be one year after the end of the data acquisition period for the proposed performance period of the grant application but exceptions to extend this period may be justified for unique or extenuating circumstances.

Program Funding

It is anticipated that up to \$3,000,000 will be available in Fiscal Year 2010, contingent on the availability of appropriated funds. The number of awards will be contingent on satisfactory peer review, programmatic relevance and the availability of appropriated funds. Requests should be

commensurate with the level of work involved and can range from \$150,000/year to \$250,000/year. Applications may request project support for up to three years, with out-year support contingent on the availability of funds, progress of the research, and programmatic needs.

DOE is under no obligation to pay for any costs associated with the preparation or submission of an application. DOE reserves the right to fund, in whole or in part, any, all, or none of the applications submitted in response to this FOA.

Merit Review

Applications will be subjected to scientific 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; and
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 may be used, and submission of an application constitutes agreement that this is acceptable to the investigator(s) and the submitting institution.

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

Posted on the Office of Science Grants and Contracts Web Site
January 21, 2010.