RESEARCH

- Create a radically new class of models that take advantage of petascale computers to produce dramatically improved simulations of the interactions of clouds with the global circulation of the atmosphere

- Identify, analyze and understand the strengths and weaknesses of the new models using a variety of state-of-the art observational datasets, derived from in situ observing systems, as well as both ground-based and satellite-borne remote sensors

- Apply the new models to develop an improved understanding of the role of clouds in the Earth system

K-12 EDUCATION & OUTREACH

- Enhancing K-12 science curriculum
- Developing teacher tools: kits, DVDs, lesson plans and other resources
- Web-based tools for students (virtual labs and Windows to the Universe)
- Climate conference for high school students
- Support for diverse communities and schools
- Mentoring program for middle school students

For opportunities with CMMAP, see *www.cmmap.org/cmmap/scienceEd/*


HIGHER EDUCATION

- Infusing climate content across undergraduate curriculum
- Teaching experience and training for graduate students
- Support for diverse graduate students
- Summer undergraduate internship program
- Diversity in Atmospheric Science Scholarships
- Opportunities for graduate students to mentor

KNOWLEDGE TRANSFER

- Work with climate modeling centers to improve their ability to simulate cloud feedbacks on climate change
- Work with numerical weather prediction centers to improve their ability to forecast clouds and precipitation
- Create an edited book on the history of global atmospheric modeling
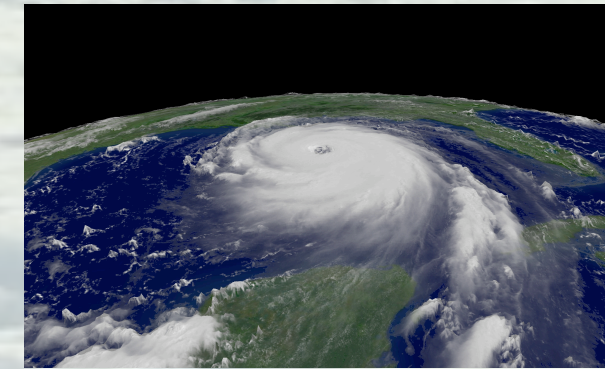
- Created a new all-electronic open-access journal names *Journal of Advances in Modeling Earth Systems*; JAMES publishes articles on a range of topics dealing with global environmental modeling
- Create and maintain a website containing a section designed to make CMMAP results easily available to the scientific community and a section designed to increase public understanding of issues in global climate modeling

CENTER FOR MULTISCALE MODELING OF ATMOSPHERIC PROCESSES

A NATIONAL SCIENCE FOUNDATION SCIENCE & TECHNOLOGY CENTER

MISSION

Research

CMMAP's research mission is to develop a new kind of global atmospheric model that can represent the effects of clouds on weather and climate with greatly improved realism; to evaluate the new model by comparison of model results with observations; and to apply the model to understand the interactions of clouds with other components of the Earth system, including the atmosphere, the vegetated land surface, and the oceans.

Education

CMMAP is educating and training a diverse population in climate and Earth System Science by enhancing teaching and learning at all educational levels, disseminating science results through multiple media, engaging stakeholders and policymakers, and improving science pedagogy.

Diversity

CMMAP is increasing the number of women, underrepresented minorities, and individuals with disabilities in climate science by aggressively recruiting these groups as CMMAP graduate students and staff members, helping them to become excellent scientists and educators, and placing them in leadership positions. We are enhancing the science and engineering pipeline through mentoring and recruiting at earlier academic levels. Finally we are studying diversity problems and solutions, and disseminating our findings.

Knowledge Transfer

CMMAP is engaging in two-way knowledge transfer that benefits the Center, the public, and the academic and research communities. This occurs through the transfer of modeling technology to other modeling centers, and through the creation of new publications channels for work on global environmental modeling.

WHAT IS CMMAP?

The Center for Multiscale Modeling of Atmospheric Processes, CMMAP (pronounced "see map"), is one of seventeen current Science and Technology Centers sponsored by the National Science foundation. CMMAP is a partnership of research and educational institutions, government agencies, and industry.

CMMAP conducts research, and promotes the education of a diverse scientific workforce. CMMAP communicates its findings to the general public, to policy makers, and to centers that predict weather and climate.

CMMAP's research is focused on improving the representation of cloud processes in climate models. The need for such improvements is one of the most important limitations on the reliability of current climate-change simulations. CMMAP is addressing this problem through a revolutionary new approach called the "multi-scale modeling framework" (MMF), in which high-resolution cloud models are coupled to lower-resolution global models.

PARTICIPATING INSTITUTIONS

Colorado State University (Lead)

- Apple Computer
- Atlantic Oceanographic & Meteorological Laboratory
- Bureau of Meteorology Research Centre, Australia
- Catamount Institute
- Center for Climate System Research, University of Tokyo
- City College of New York
- Colorado College
- European Centre for Medium Range Weather Forecasting
- Frontier Research Center for Global Change, Japan
- Geophysical Fluid Dynamics Laboratory
- Goddard Space Flight Center
- Hampton University
- Institute of Global Environment & Society
- Langley Research Center
- Lawrence Livermore National Laboratory
- Meteorological Service of Canada
- National Center for Atmospheric Research
- National Centers for Environmental Prediction
- Pacific Northwest National Laboratory
- Poudre School District
- Scripps Institution of Oceanography
- Thompson School District
- University of California, Berkeley
- University of California, Los Angeles
- University of California, San Diego
- University of Colorado
- University Corporation for Atmospheric Research
- University of Maryland
- University of New York, Stony Brook
- University of Utah
- University of Washington

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CENTER FOR MULTISCALE MODELING OF ATMOSPHERIC PROCESSES

CMMAP

Reach for the sky.

A NATIONAL SCIENCE FOUNDATION SCIENCE & TECHNOLOGY CENTER