



Climate Research in Service to Society

Variations of the Earth's climate affect the entire population and all the societies of the planet. Understanding how and why the climate changes from time to time and place to place on the globe is of central importance to many economic sectors and the social welfare of everyone. Taking the next step by using our growing understanding of climate to make predictions of its variations is the major challenge facing Earth scientists.

The Institute of Global Environment and Society, Inc. (IGES) - a non-profit, tax exempt research institute, incorporated in the State of Maryland - was established to improve understanding and prediction of the variations of the Earth's climate through scientific research on climate variability and climate predictability, and to share both the fruits of this research and the tools necessary to carry out this research with society as a whole. The staff of IGES includes a dedicated group of scientists uniquely qualified to conduct basic research in these areas. Application of scientific knowledge for the sustainable development of society is an important objective of the Institute.

The Institute has established a center of excellence dedicated to basic research on the Earth's current climate: the [Center for Ocean-Land-Atmosphere Studies \(COLA\)](#) . By consolidating several research grants from three different federal agencies (NSF, NOAA and NASA), a single, multi-agency, multi-year research project was developed to create a critical mass of scientists working together as a team at COLA on the basic problem of the predictability of the present climate. With continuing multi-agency support, COLA has become a national center of excellence for research on climate variability and predictability. The goal of COLA research is to explore, establish and quantify the predictability and prediction of seasonal to interannual variability of the present climate through the use of state-of-the-art dynamical coupled ocean-atmosphere general circulation models and the development of new techniques for analysis of observational and model data.

The institute has established a second center of excellence dedicated to basic research on the Earth's water cycle and how changes in this cycle impact the global environment: the [Center for Research on Environment and Water \(CREW\)](#)

. The goal of CREW research is to quantify and predict water cycle and environmental consequences of earth system variability and change through focused research investments in observation, modeling, and application. CREW research integrates across traditional disciplines to develop an end-to-end program that transitions theoretical research to academic/public education and real-world application, through partnerships with universities, the government, and international agencies. The center goal of improved and applicable predictions of the water and energy cycles will require decisive progression from observations to improved understanding and modeling, and eventually to better prediction and application. The three CREW elements can be summarized as follows:

- Observation: Quantify long-term water cycle trends & variability; enable progression toward a coordinated water cycle observation system; extract knowledge and understanding from diverse observations to enhance prediction capability.
- Modeling & Prediction: Use multiple state-of-the-art "operational" earth-system models; conduct sensitivity and predictability experiments; infuse process-scale understanding to predict water cycle extremes. Enhance prediction through observational constraints; explore limits of water cycle predictability.
- Solutions: Enhance operational decision support tools with improved prediction; Engage in public and research community education; application; link to other earth system components

There is also an interest at IGES in the application of new scientific insights and emerging climate prediction capabilities to practical problems of sustainable economic development, resource management, and public health and safety. Through the involvement of scientists with the interested stakeholders in these issues of vital importance for society and the environment, IGES transforms scientific research results into information of value for policy guidance and development.

The Institute interacts with climate research institutions in the U.S. and throughout the world. Fruitful collaborations have been undertaken with institutes in Brazil, India and Italy as well as with international centers such as the **International Research Institute for Climate Prediction** and the **International Center for Theoretical Physics**.

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