Atmospheric Sciences and Global Change Research at Pacific Northwest National Laboratory

Pacific Northwest NATIONAL LABORATORY

Transforming the Ability to Predict Climate Change and Its Impacts

Our Mission

We conduct research to understand the Earth system processes and human decisions that drive regional and global earth systems, with a primary focus on climate aerosol and cloud physics; global and regional scale modeling; integrated assessment; and complex regional meteorology and chemistry.

We apply this knowledge to investigate the consequences of energy options and carbon management solutions nationally and globally.

Science Insights for More Informed Decisions

- Improved scientific understanding of the fundamental processes that influence global change
- More accurate, realistic models for climate prediction and resource management
- Science-based insights for government and industry decision-makers on climate mitigation strategies, energy options, and consequences

Atmospheric Sciences Program

- Conducting integrated laboratory, field measurement, and modeling studies to better understand the formation, transport, transformation, optical properties, and fate of climatically important atmospheric aerosol particles
- Improving the understanding of the effects of clouds and aerosols on the Earth's energy budget
- Improving the ability to model climate-relevant processes at global and regional scales
- Operating major surface-based and airborne facilities for particulate, chemical, and meteorological measurements
- Leading worldwide field campaigns for aerosol and meteorological research
- Developing advanced instrumentation to better characterize aerosol composition and behavior

Atmospheric Radiation Measurement Program

- U.S. Department of Energy's multi-institutional program to improve the understanding of cloud processes and their influence on the Earth's solar energy balance
- PNNL leadership and contributions:
  - Science, including research and field campaigns worldwide to improve the accuracy of climate models
  - Technical direction for global scientific user facilities

Integrated Assessment

- Integrating science, technology, economics, and policy related to global change
- Computer-based, integrated assessment modeling system
- Analyzing the effects of adopting mitigation strategies ranging from energy efficiency and biofuels to carbon capture and sequestration
- Significant contributors to the Intergovernmental Panel on Climate Change, which won the 2007 Nobel Peace Prize

Sequestration in Terrestrial Ecosystems

- U.S. Department of Energy consortium – establishing the scientific basis for enhancing carbon capture and long-term terrestrial sequestration
- Includes conceptual and computational models to understand sequestration potential and processes across spatial and temporal scales

www.pnl.gov/atmospheric/