

## 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

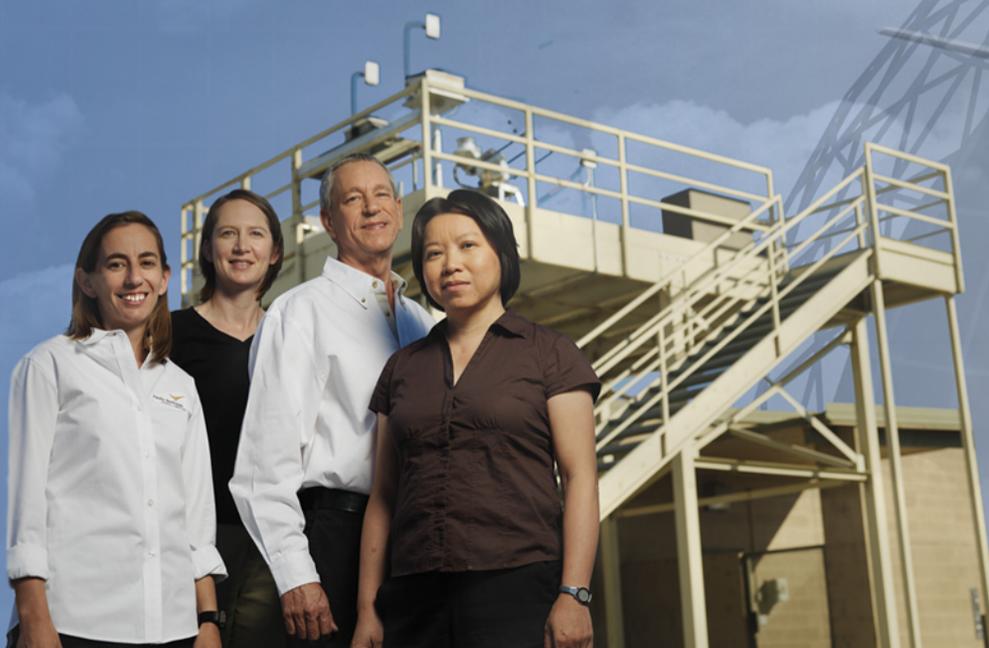
### Integrated Assessment

- 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/](http://www.pnl.gov/atmospheric/)



CARBON EMISSIONS

