

An Overview of the EPA's Air Climate & Energy Research Program

First Workshop on Satellite and Above-Boundary Layer Observations
for Air Quality Management
Boulder, CO May 9, 2011

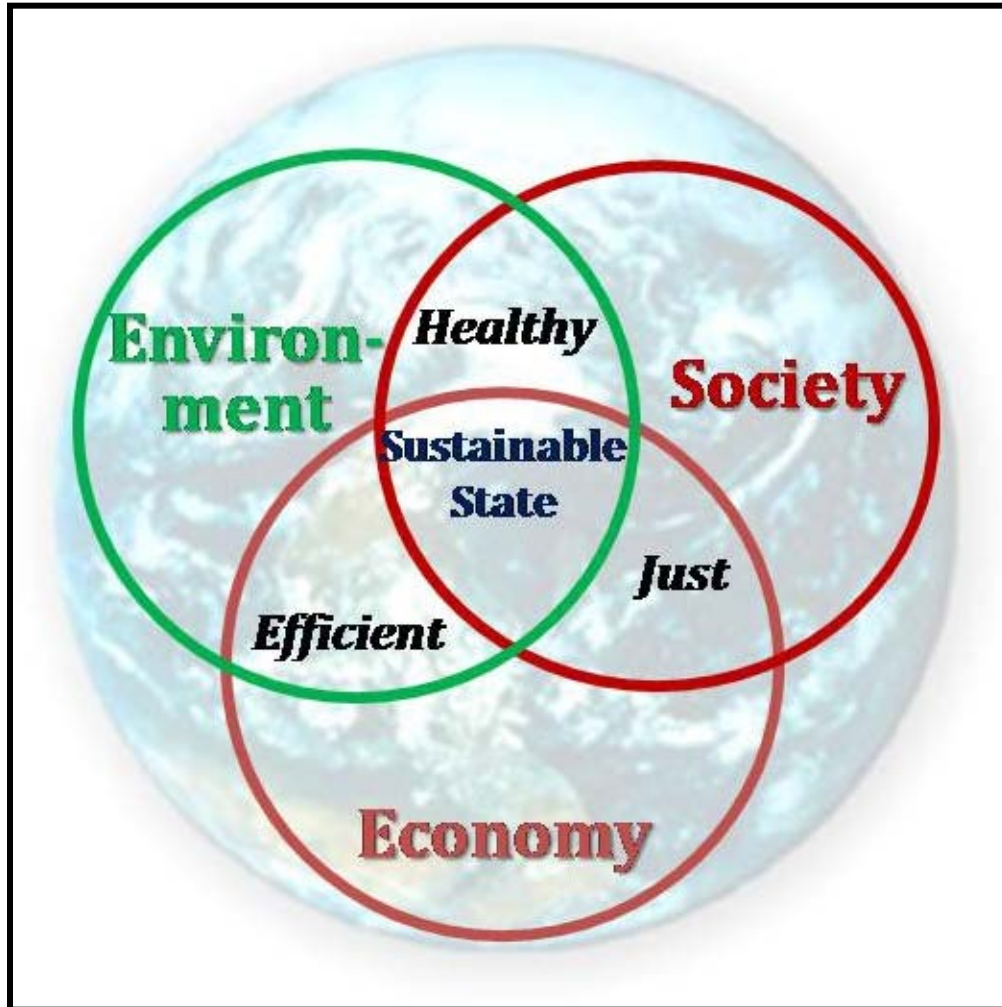
Tim Watkins – Acting Deputy National Program Director



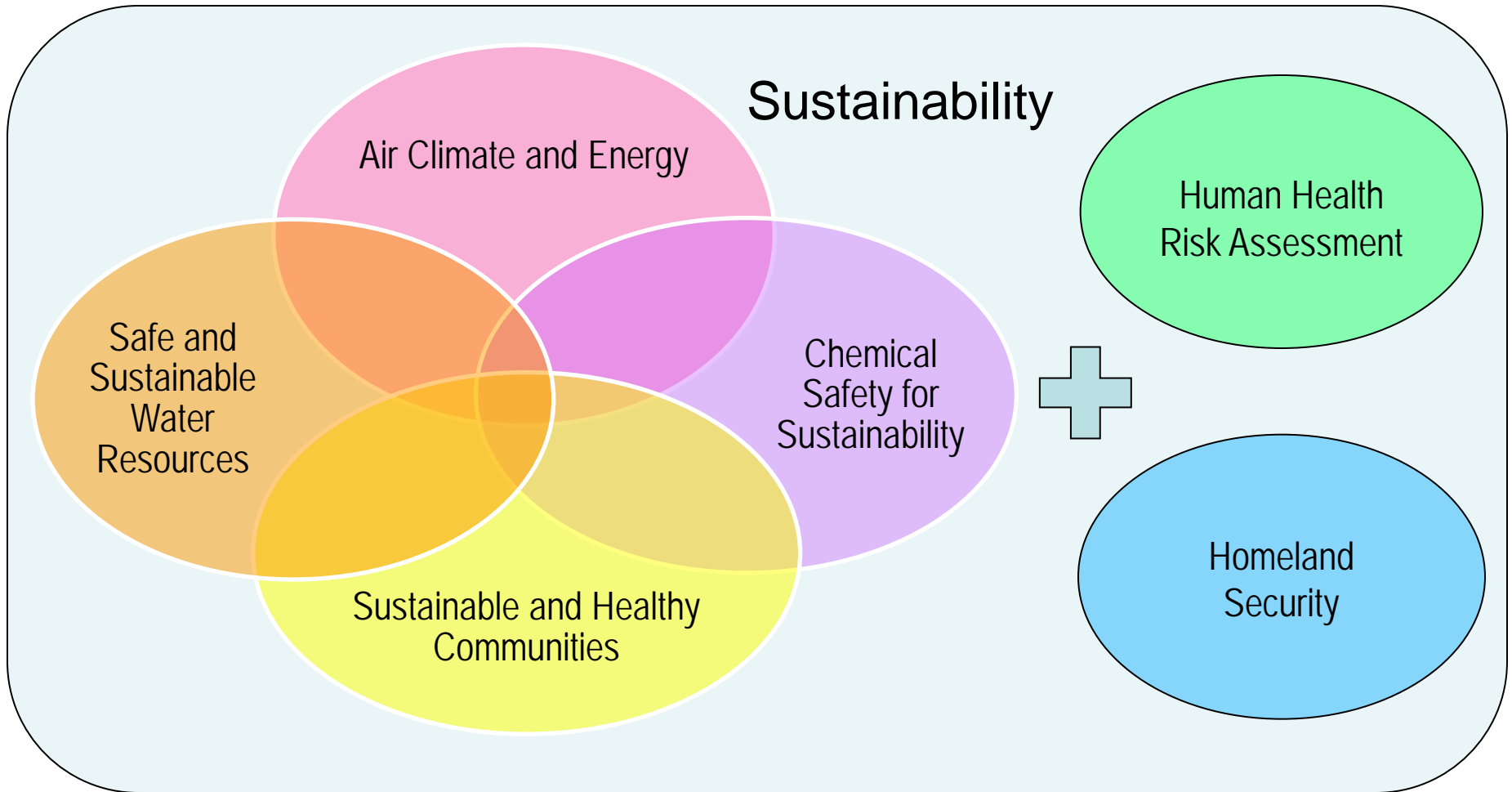
Transforming the EPA's Office of Research and Development – “The Path Forward”

- *Sustainability* is the “true north” that will guide our research and innovation priorities
- We will create broad sustainability research programs based on *systems thinking*
- We will engage with our *stakeholders* to develop *sustainable solutions* relevant to their needs
- We will engage in *integrated, transdisciplinary* research throughout our portfolio
- We will be a *catalyst* for progress in sustainability in the U.S. and around the world

The Concepts of Sustainability and Systems Thinking



Integrated ORD Research Programs





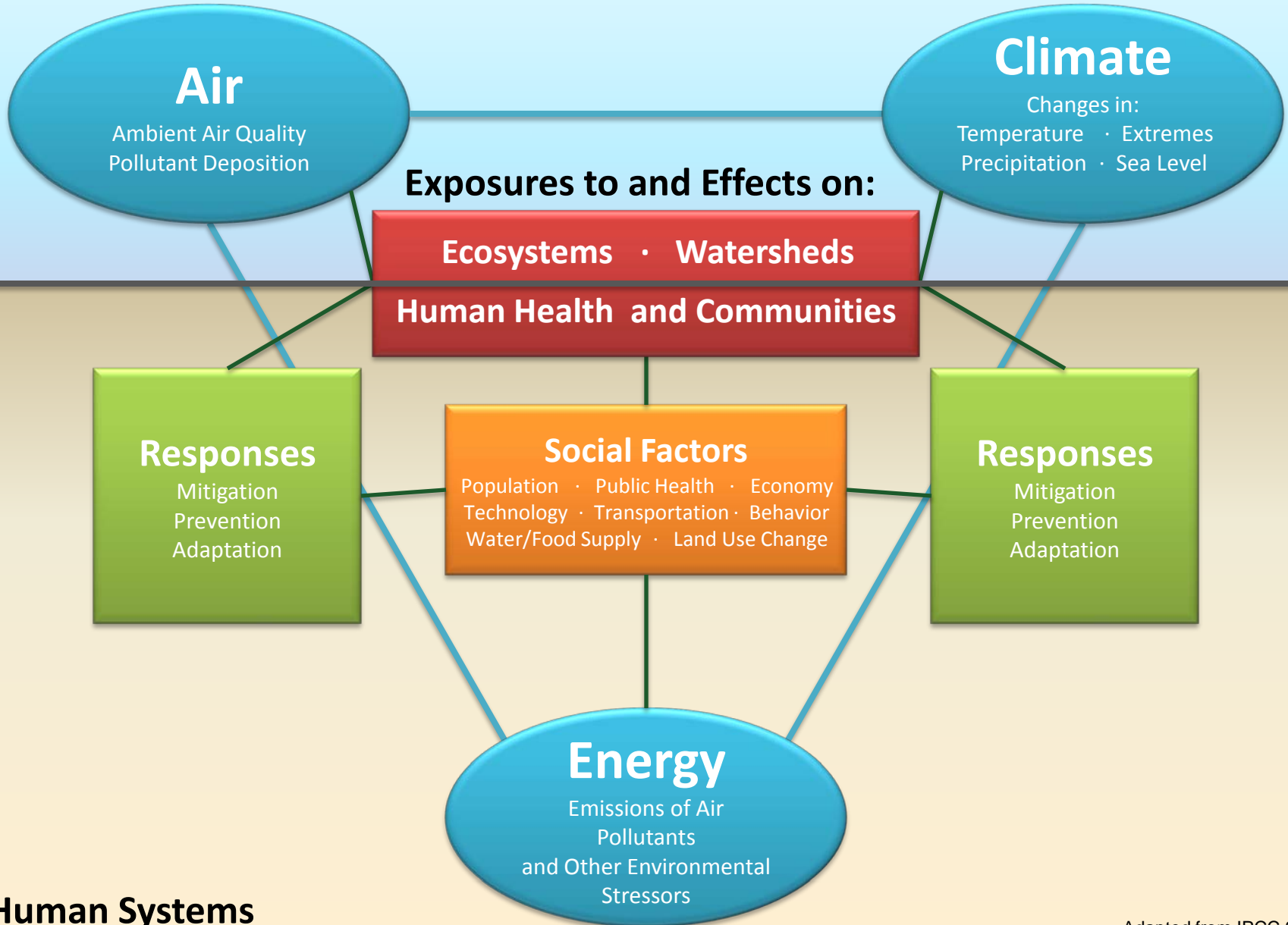
ACE Problem Statement:

Protecting health and the environment from the impacts of climate change and air quality are central 21st century challenges. These challenges are complicated by the interplay between air quality, the changing climate, and emerging energy options.

ACE Vision:

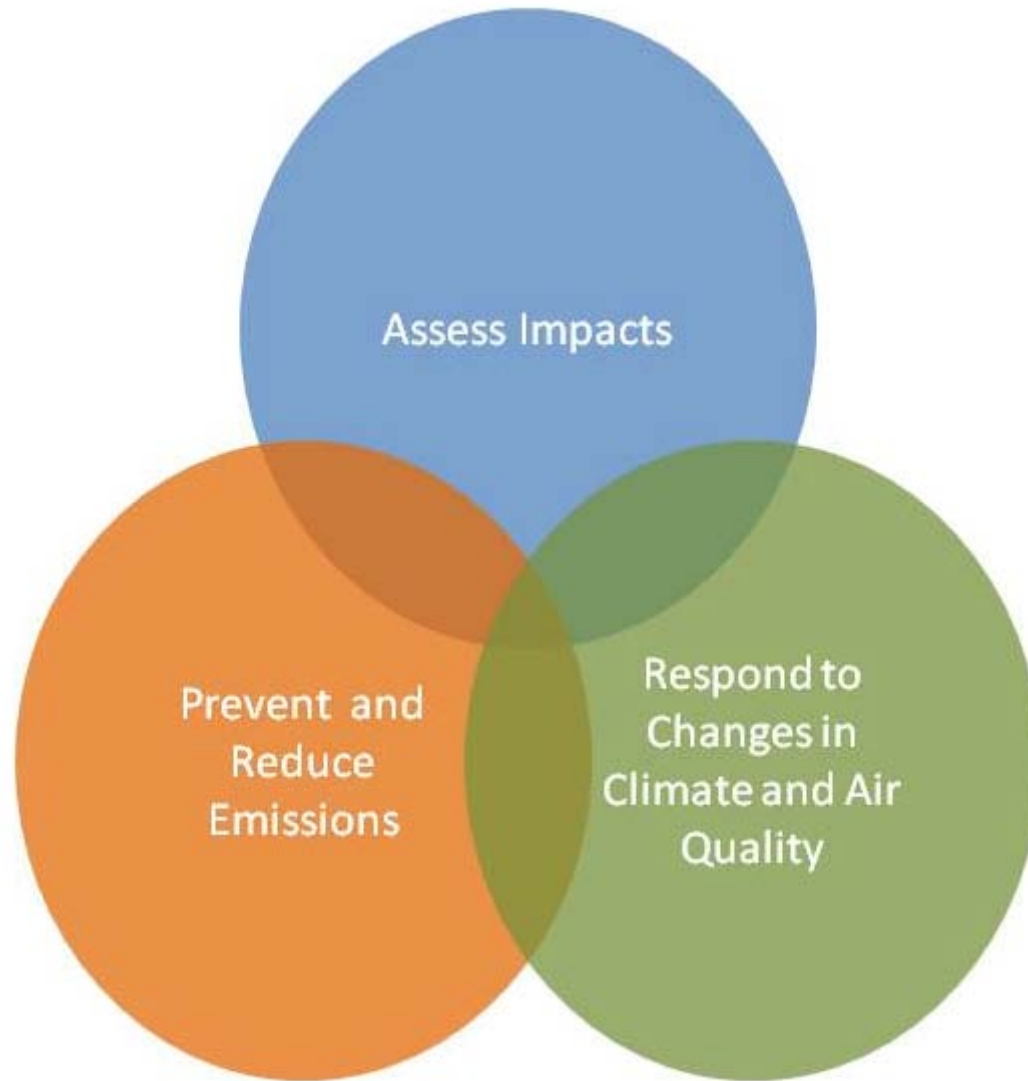
The ACE program will provide cutting-edge scientific information and tools to support EPA's strategic goals to protect and improve air quality and take action on climate change.

Earth Systems



Human Systems

ACE Research Themes



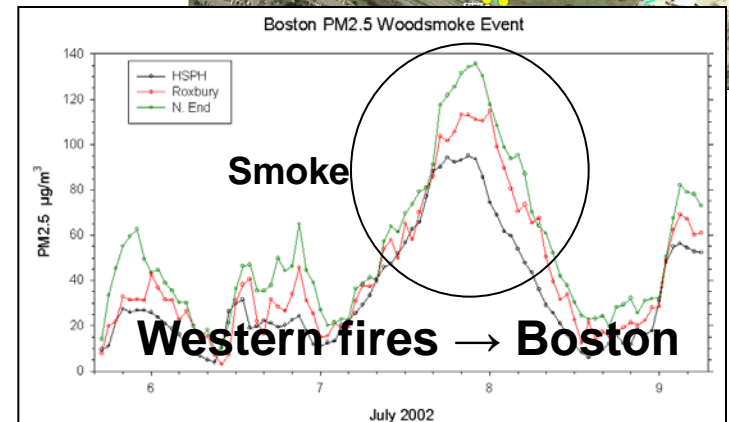
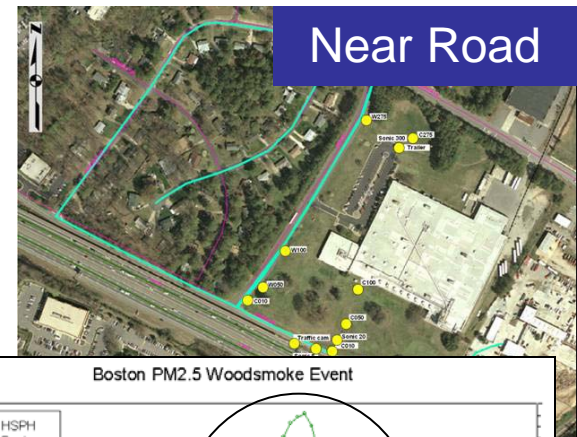
ACE: Research Theme 1

Assess Impacts

Assess human and ecosystem exposures and effects associated with air pollutants and climate change at individual, community, regional, and global scales.

Objectives:

- Inform the review of the NAAQS
- Assess multipollutant exposures and effects
- Innovative approaches to assess exposures and effects of pollutants in the atmosphere
- Identify characteristics of populations and ecosystems susceptible to exposure to air pollutants and climate change



ACE: Research Theme 2

Prevent and Reduce Emissions

Provide data & tools to develop and evaluate approaches to prevent and reduce emissions of pollutants to the atmosphere, particularly environmentally sustainable, cost effective, and innovative multipollutant and sector-based approaches



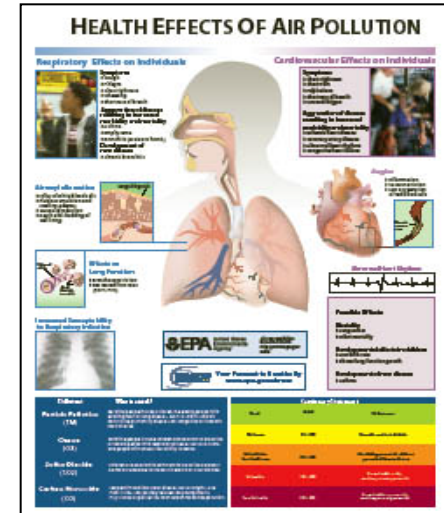
Objectives:

- Support the management of air pollution problems at different scales of time and space
- Support implementation of NAAQS
- Innovative technologies to support AQ management strategies
- Evaluate pollution reduction and prevention solutions
- Develop methods and data for life-cycle analyses of alternative pollution reduction and energy options

ACE: Research Theme 3

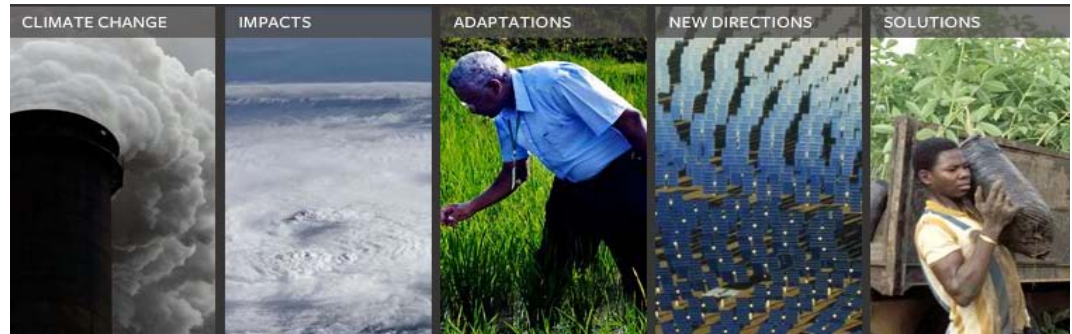
Respond to Changes in Climate & Air Quality

Provide human exposure and environmental modeling, monitoring, metrics and information needed by individuals, communities, and governmental agencies to adapt to the impacts of climate change and make informed public health decisions regarding air quality



Objectives:

- Evaluate alternative adaptation strategies
- Devise innovative methods to inform individual- and community-level adaptation to climate change and decision making for air quality
- Evaluate social, behavioral, and economic factors that influence adaptation strategies for climate change and decision making for air quality



Satellite Observations Could Support ACE Partner Needs

Research Topics for ACE Partner Needs

ACE Framework

Theme 1:
Assess Impacts

Theme 2: Prevent
/ Reduce
Emissions

Theme 3:
Respond to
Changes

Biomass

Climate Mitigation/
Adaptation

Climate Air Quality
Interactions

Emissions

Energy

Measurements

Modeling / Decision
Support Tools

Multipollutant

NAAQS

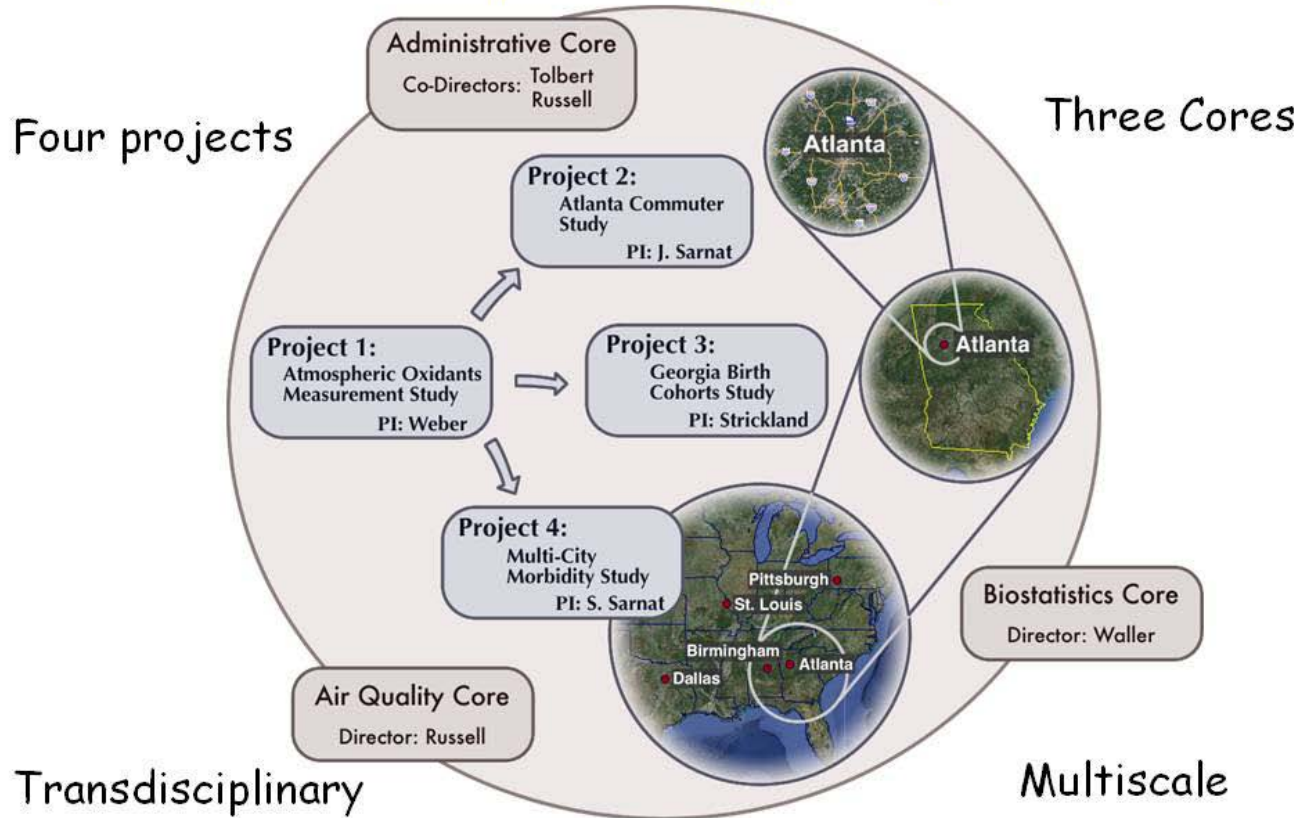
Sustainable Solutions

Potential
Applications for Air
Quality Related
Satellite
Observations

Examples of ACE Partner Needs that could be Informed by Air Quality Related Satellite Observations

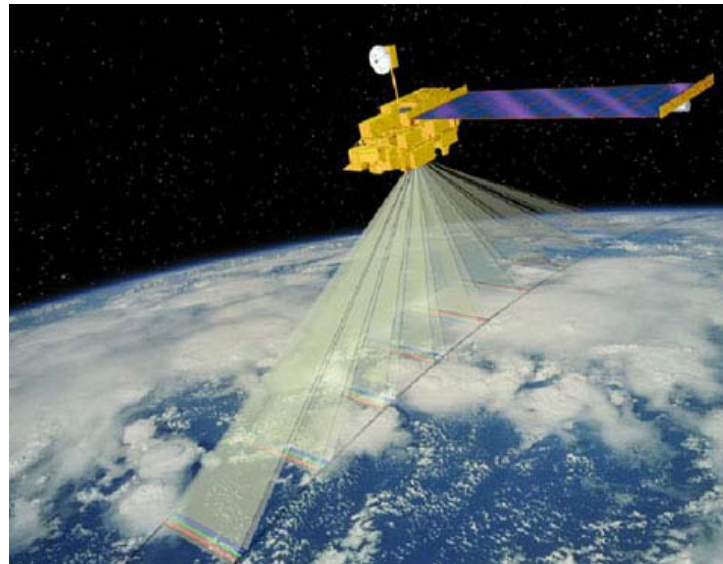
- Relationships between air quality, climate and human and ecological health impacts
- Characterize the impact of short-lived climate forcers
- Improved emission inventories
 - Spatial/temporal distribution
 - Natural sources and biomass burning
- Innovative measurements for exposure assessment, source characterization, and compliance monitoring
 - How do we meet existing measurement requirements AND new measurement challenges without increasing resources for monitoring?
 - Need a paradigm shift
- Enhanced modeling/decision support tools
 - Chemical/physical processes
 - Near Source/Local/Global scale monitoring and modeling
 - Background concentrations
 - Exceptional events (e.g., fires)
- Multipollutant exposures

Southeastern Center for Air Pollution and Epidemiology (SCAPE)



Use satellite data to assess acute and chronic exposures to $PM_{2.5}$ in New England

Harvard
Clean Air
Research
Center



A Novel Calibration Approach of AOD Data to Predict $PM_{2.5}$ Concentrations

Concluding Thoughts

- Next Steps for ACE Program
 - Develop Research Action Plan to identify approaches to address partner needs (could include application of satellite observations)
 - EPA Science Advisory Board (SAB) review in late June
 - ACE Program effective Oct 1, 2011
- Other opportunities for application of satellite observations in new ORD Research Programs
 - Sustainable and Healthy Communities
 - Safe and Sustainable Waters
- Preliminary discussions about improving coordination of ORD interests and interactions with remote sensing community