

Agricultural Research Service



Air Quality Research Overview, Issues and Priorities



Air Quality Research Program

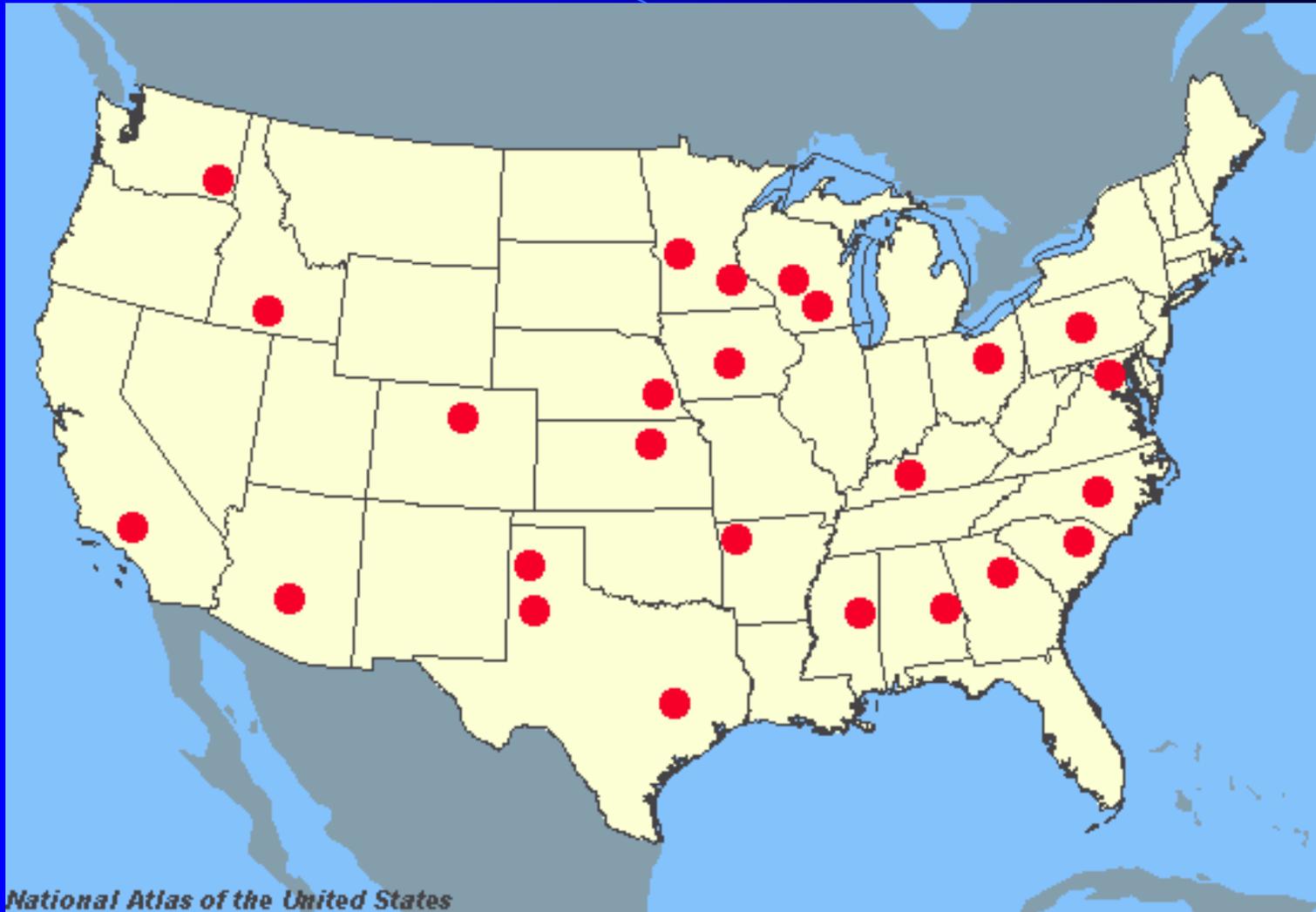
Through research,

- understand the processes of air pollution emissions from agricultural enterprises, and the effects of air quality upon agriculture,
- develop and test control measures, and
- provide decision aids useful for minimizing and reducing agricultural air pollution emissions, and predicting and mitigating the impacts of air quality upon agriculture

Program Components

- Particulate Emissions
- Ammonia and Ammonium Emissions
- Malodorous Compounds
- Ozone Impacts
- Pesticides and Other Synthetic Organic Compounds

Agricultural Research Service Air Quality Research Locations



National Atlas of the United States

Air Quality Research Program

National Program Team

- Charles Walthall (Leader)
 - Robert Wright
 - Mark Walbridge
-
- Air Quality & Global Change

Global Change Research

- Understand *impacts* on agriculture
- Develop technologies for *adaptation*
- *Mitigate* agricultural impacts on climate

- Carbon Cycle and Carbon Storage
 - Greenhouse gas Reduction through Agricultural Carbon Enhancement network:
GRACEnet

- Trace Gases
 - Methane, nitrogen oxides, ammonia

Air Quality Research

- Research Program 5 Year Cycle
 - **Accomplishment Report 2007**
 - Panel reviews*
 - **Workshop April 2008**
 - Stakeholders
 - Scientists and Program Staff
 - Research Action Plan 2008
 - Research Project Plans 2009
 - Panel reviews*
 - Research Project Implementations 2010

*OSQR Oversight

Recent Activities

- Field Measurement Campaigns with Space Dynamics Laboratory
 - SDL Laser system development for PM and gas measurements
 - ARS *in situ* measurements and process modeling
 - Dairy, almond, cotton ginning, field operations PM

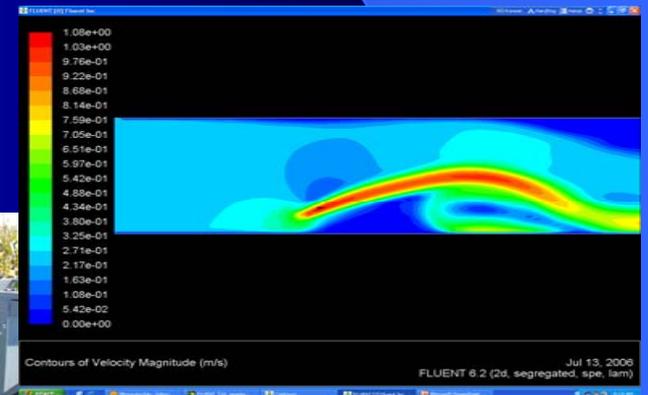
Recent Activities

- Collaborations with NASA
 - Data base development
 - Modeling
 - New modeling tools
 - Collaborative research
 - Product development for users
 - Earth Observations
 - Measurements
 - Technology development

Recent Activities

- Modeling particulate and microbial transport during center pivot wastewater irrigation
 - Conflicting conclusions on health-related risks from field applications of waste water
 - Bioaerosols
 - How far will it travel?
 - Microbial survival rate?
 - Role of weather factors?
 - Lincoln, NE scientist & ARS HQ-funded post doc

- **Goal: Guidelines for manure application**
- **Methods**
 - Field bioaerosols experiment
 - Controlled wind tunnel experiment
 - Computational Fluid Dynamics Model modification

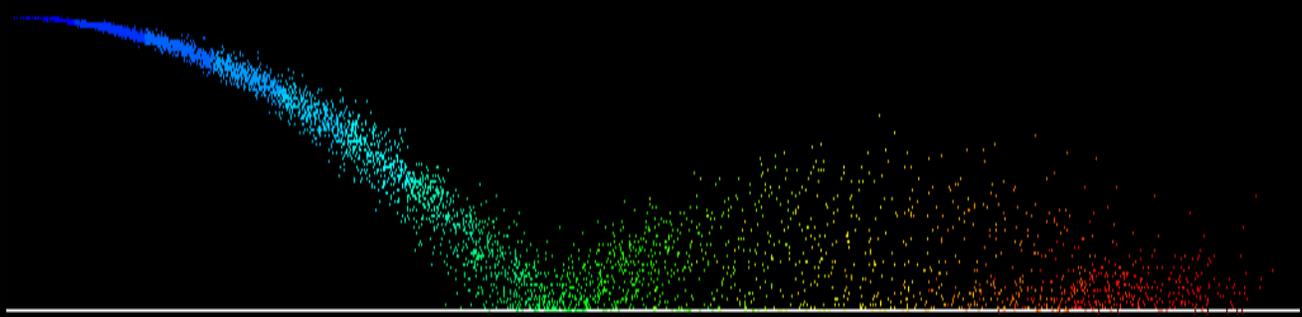


CFD modeling

FLUENT [0] Fluent Inc



Unregistered HyperCam 2



Particle Traces Colored by Particle Residence Time (s)

FLUENT 6.2 (2d, segregated, ske)