WASHINGTON STATE UNIVERSITY

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Assistant Professor

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LAR Home Page

EDUCATION

- Ph.D, Chemical Engineering, 2004 - California Institute of Technology
- B.S., Chemical Engineering, 1997- University of Florida

PROFESSIONAL EXPERIENCE

- January 2007 to present, Assistant Professor, Department of Civil & Environmental Engineering, Laboratory for Atmospheric Research, Washington State University
- 2004 - 2006, Postdoctoral Fellow, Advanced Study Program, National Center for Atmospheric Research, Boulder, CO
- 2003 - 2004, Postdoctoral Scholar, Department of Environmental Science & Engineering, California Institute of Technology

AWARDS

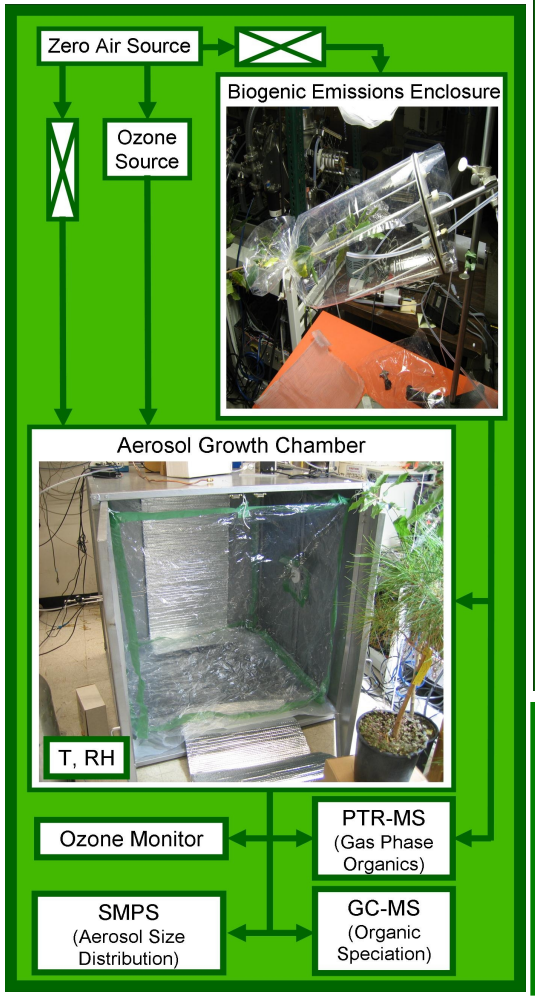
- 2004 - 2006, NCAR Advanced Study Program Postdoctoral Fellowship
- 1998 - 2001, EPA STAR Graduate Fellowship

RESEARCH

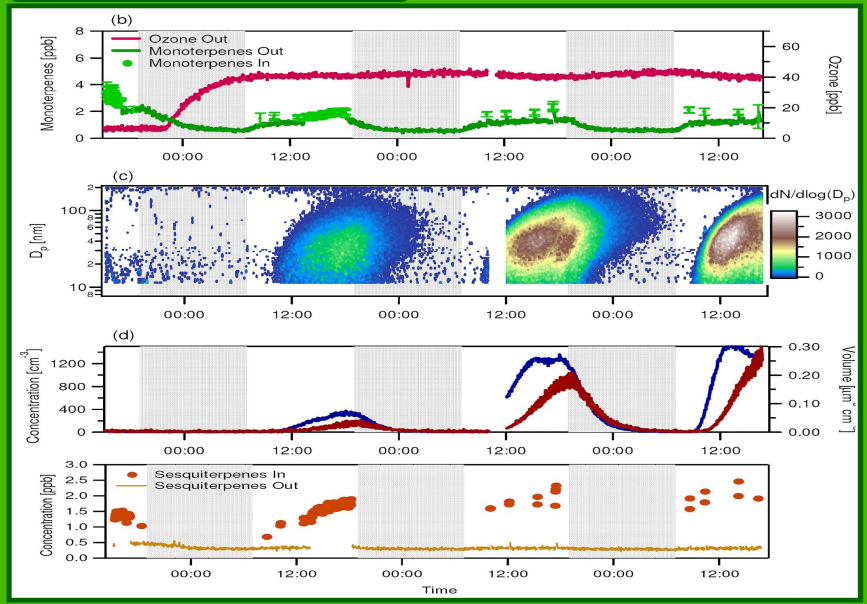
- Biogenic Secondary Organic Aerosol Formation
- Aerosol/Cloud Interactions
- Instrument Development
- Ice Nucleation Theory

www.ce.wsu.edu/Faculty_Staff/Profiles/vanreken.htm

SOA Formation Directly from Plant Emissions



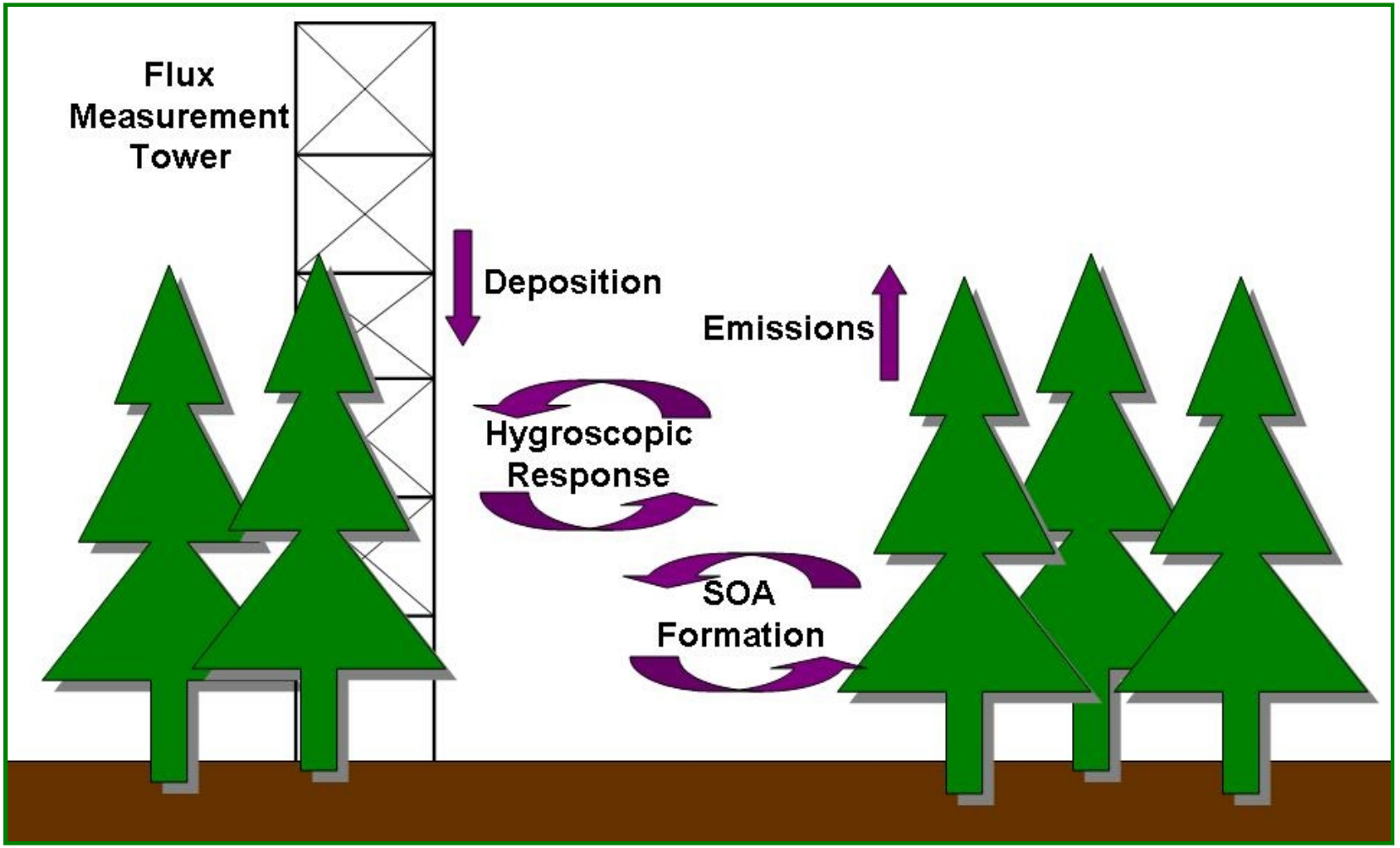
Loblolly Pine (*P. taeda*)



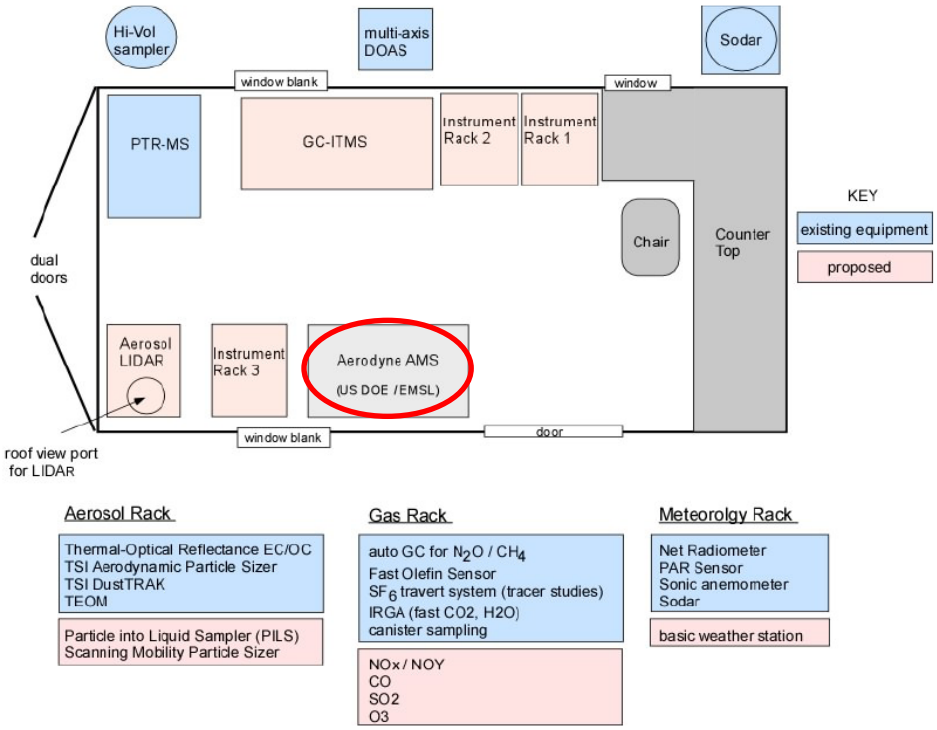
- Emits monoterpenes and sesquiterpenes.
  - *Not strongly light dependent.*
- Total monoterpenes: ~2 ppb (+ 50 ppb O_3).
  - *Sesquiterpenes also detected (<1 ppb).*
- New event each day.
  - *Events occur ~3 hrs. after ozone addition or start of photoperiod.*
- Mode diameter grows to 40-50 nm over 3-4 hrs.
- N_{max} ~ 1400 cm^{-3}.

- Experiments at NCAR have shown that new particle formation can occur directly from plant emission oxidation products.
- Continuing work at WSU will focus on characterizing the physicochemical properties of plant-derived SOA, and on understanding what species contribute to SOA production.

Flux Measurements of Aerosol Properties

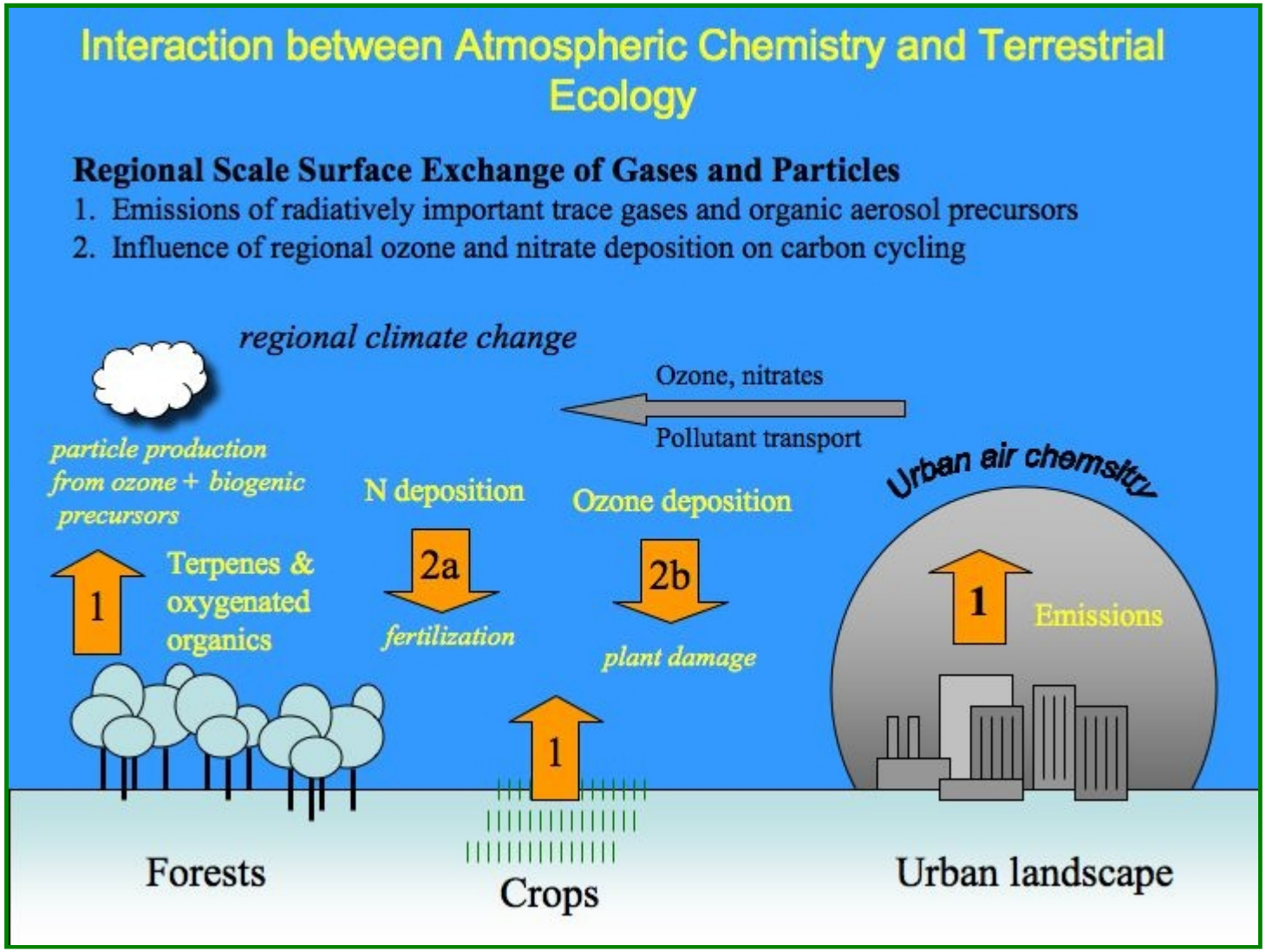


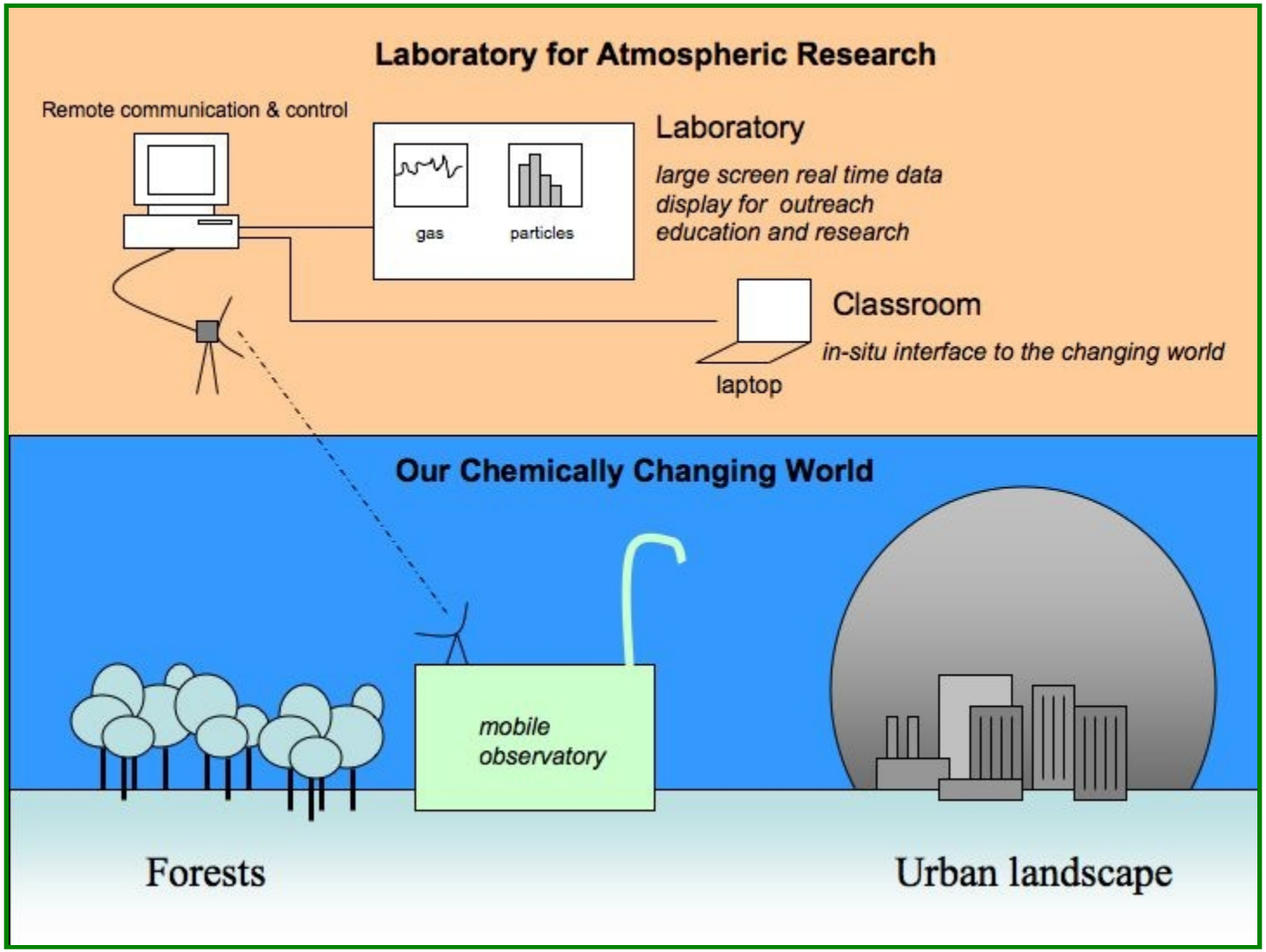
Integrated Atmospheric Chemistry Mobile Laboratory



Description	Function
Mobile Instrument Trailer	Mobile trailer for equipment and workspace
Remote communications	Satellite communication for remote access and control
Aerosol LIDAR	Time-height aerosol profiles
Scanning Mobility Particle Sizer (SMPS)	Particle size distribution from 25 nm to 500 nm
Particle in Liquid Sampler (PILS) and Ion Chromatograph (IC)	Particle collection device for ion analysis (nitrate, sulfate, organic acids, ammonium)
Gas Chromatograph Ion Trap Mass Spectrometer (GC-ITMS) with preconcentrator	On-line measurement of trace organic gas concentrations that are precursors to aerosols and ozone formation
Fourier Transform Infrared (FTIR) Spectrometer	Long path measurement of organic and inorganic compounds
Weather station	Basic meteorology measurements
O_3 monitor	instrument to measure ozone
SO_2 monitor	instrument to measure SO_2
CO monitor	Research grade instrument for measurement of CO
NOx / NOy monitor	Research grade measurements of NO, NO_2, and NOy

- $808k MRI Proposal just funded by NSF.
- Simultaneous detailed characterization of gas and aerosol properties and the boundary layer meteorology.


Interaction between Atmospheric Chemistry and Terrestrial Ecology
Regional Scale Surface Exchange of Gases and Particles
1. Emissions of radiatively important trace gases and organic aerosol precursors
2. Influence of regional ozone and nitrate deposition on carbon cycling
regional climate change
Ozone, nitrates
Pollutant transport
particle production from ozone + biogenic precursors
N deposition
Ozone deposition
Urban air chemsitry
1
Terpenes & oxygenated organics
2a
fertilization
2b
plant damage
1
Emissions
1
Forests
Crops
Urban landscape


Laboratory for Atmospheric Research
Remote communication & control
gas
particles
Laboratory
large screen real time data display for outreach education and research
Classroom
in-situ interface to the changing world
laptop
Our Chemically Changing World
mobile observatory
Forests
Urban landscape