



# **Rapid Prototyping of EPA Surface NO<sub>2</sub> and OMI NO<sub>2</sub> comparisons**

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# Overview of Rapid Prototyping Capability (RPC)

## Applied Sciences

- Crosscutting Solutions Program element
- Integrated Benchmark Systems
- RPC
- Experiments

## What is RPC?

- Testing feasibility of an idea
- Short timeline 3-8 months and <\$200K

## What is the RPC process?

- Experiment plan form submitted to RPC Council
- Review of experiment plan by RPC Council monthly



# Examples of Rapid Prototyping at Langley



Validation of OMI Data to Enhance EPA Ground Network Data

8 months  
~\$145k

Kleb et al.



Utility of NASA's Solar and Meteorological Data For Regional Level Modeling of Agricultural and Bio-fuel Crop Phenology and Yield Potential

6 months  
~\$170k

Stackhouse et al.



Investigation of the Relationship Between Satellite Observations of Tropospheric Ozone, Crop Yield, and Climate Over the Midwest

6 months  
~\$140k

Fishman et al.

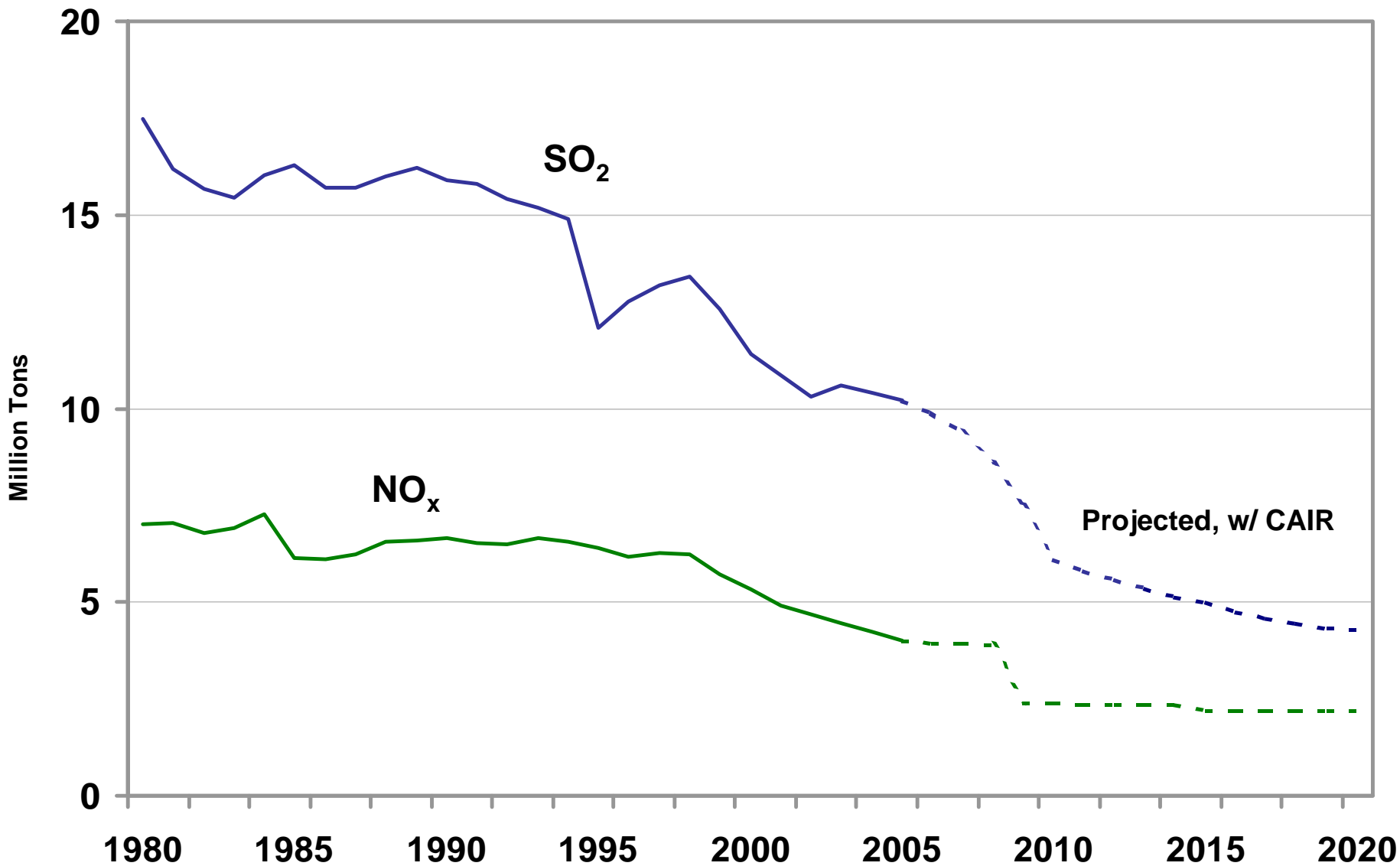


Space Weather Graphic Product for Communications, Navigation and Surveillance Systems Decision Support

Mertens et al.  
NCAR  
DEVELOP

6 months  
~\$90k

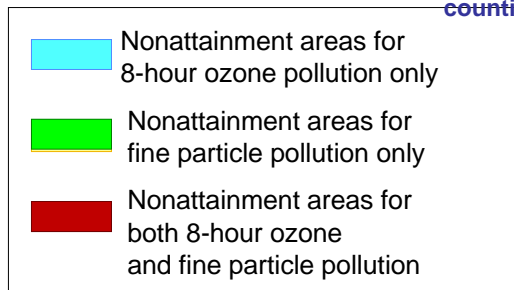
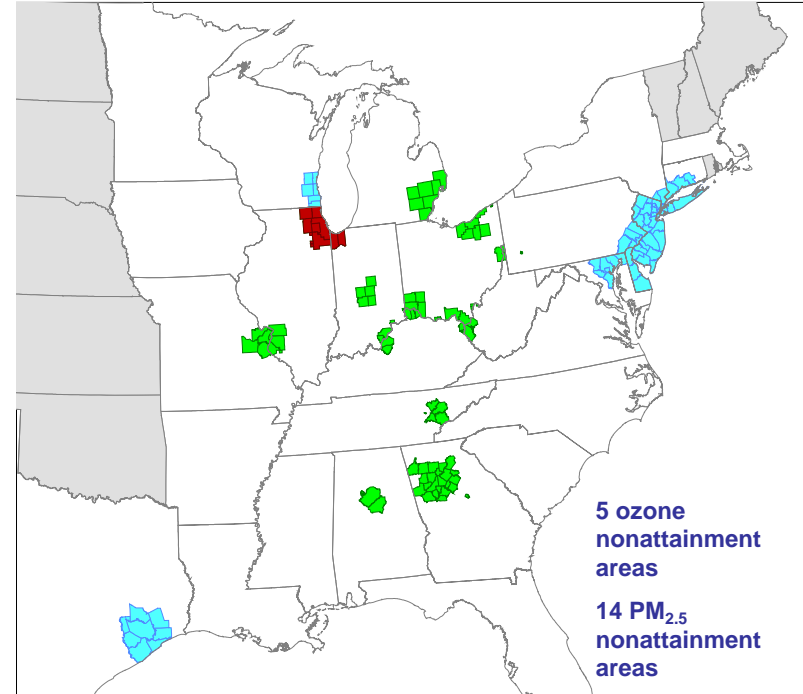
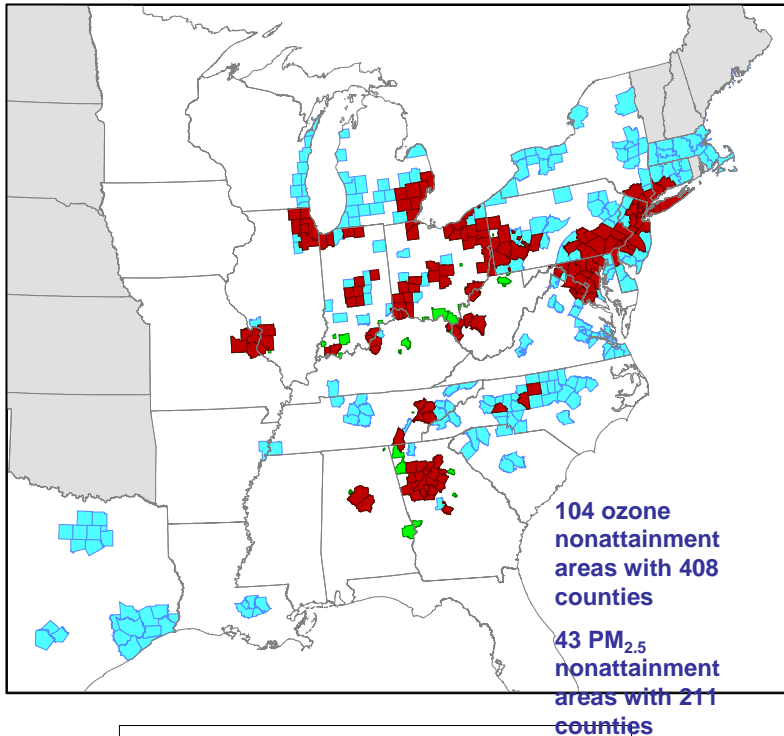
# National NO<sub>x</sub> and SO<sub>2</sub> Power Plant Emissions: Historic and Projected with CAIR



# Ozone and Particle Pollution: CAIR, together with other Clean Air Programs, Will Bring Cleaner Air to Areas in the East - 2015

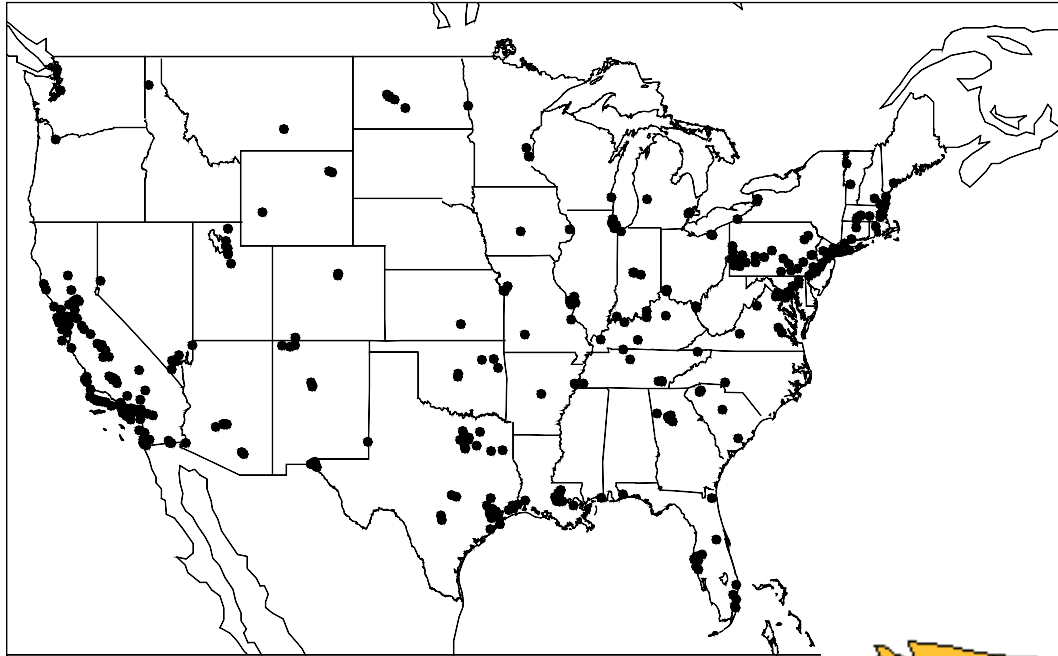
Ozone and Fine Particle Nonattainment Areas (March 2005)

Projected Nonattainment Areas in 2015 after Reductions from CAIR and Existing Clean Air Act Programs



Projections concerning future levels of air pollution in specific geographic locations were estimated using the best scientific models available. They are estimations, however, and should be characterized as such in any description. Actual results may vary significantly if any of the factors that influence air quality differ from the assumed values used in the projections shown here.

EPA Ground Station Locations



EPA surface monitors clustered in urban areas

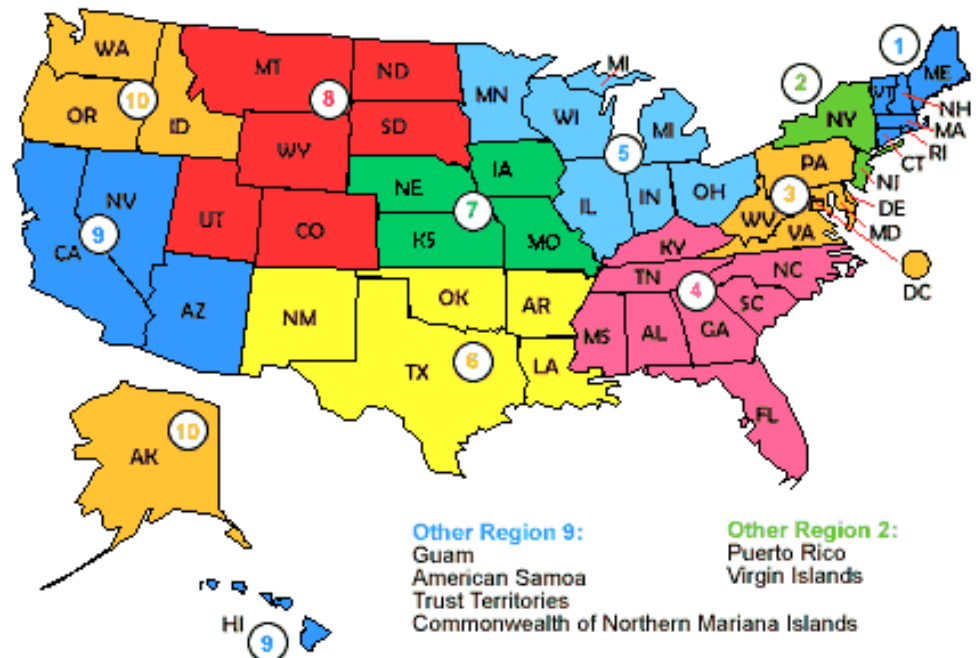
Sparse coverage in rural areas

Can satellite data provide information in regions where there are no surface monitors?

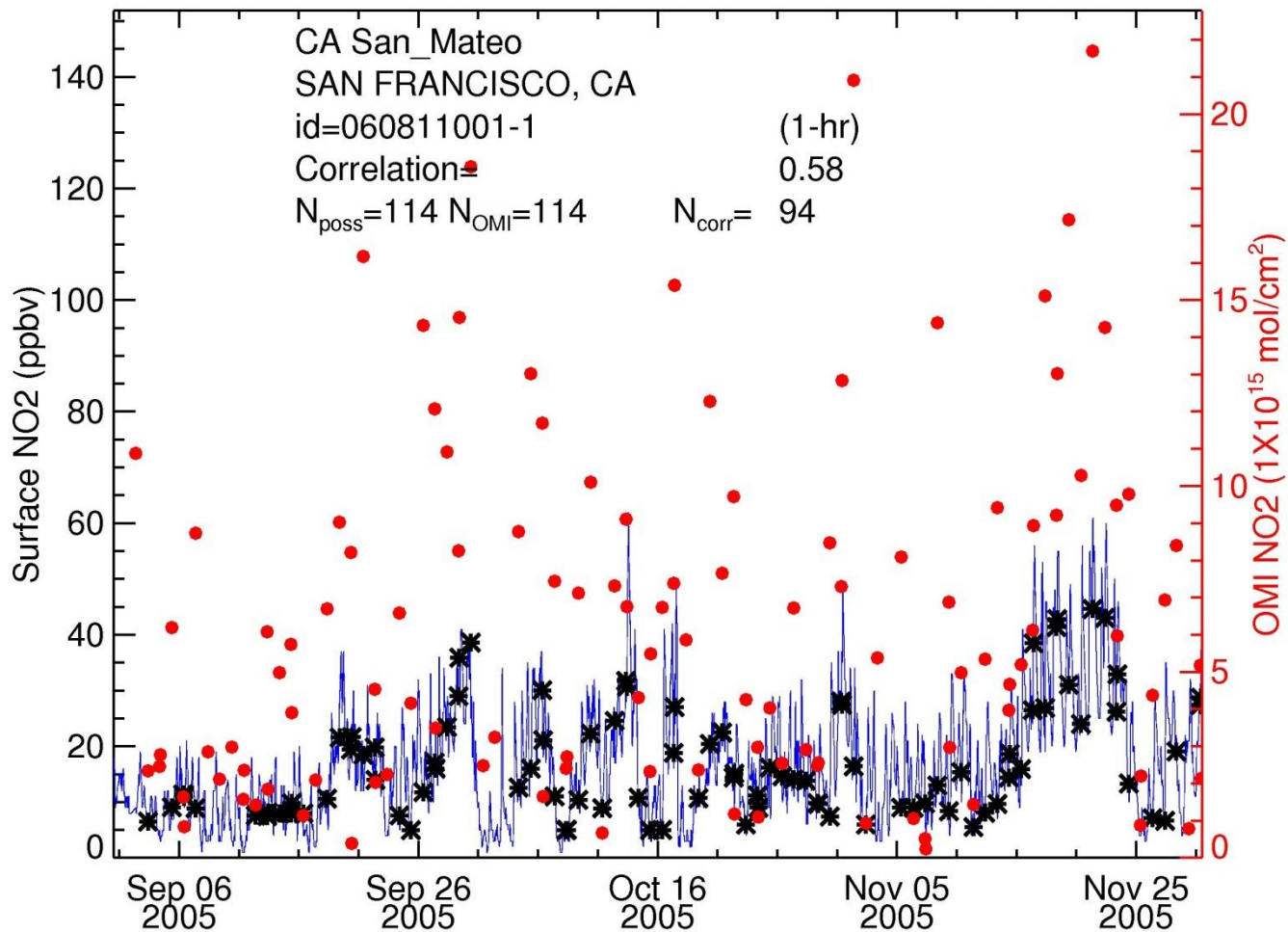
Approach:

Use 1yr of EPA and OMI NO<sub>2</sub> data (Sept05 – Aug06) to derive statistical prediction equation

Determine uncertainties in prediction of surface NO<sub>2</sub> using OMI NO<sub>2</sub> as move farther from surface stations



# EPA Surface and OMI Column NO2 20050901-20051130



# Preliminary Results

**Direct correlation between EPA NO<sub>2</sub> and OMI NO<sub>2</sub> at individual stations low during Fall '05 (~<0.50)**

**Error increases as SZA increases**

**Other factors to consider in statistical analysis**

- PM<sub>2.5</sub>
- OMI footprint size: nadir (13km x 24km) vs edges (13km x 150km)
- Range of NO<sub>2</sub> values from EPA and OMI

