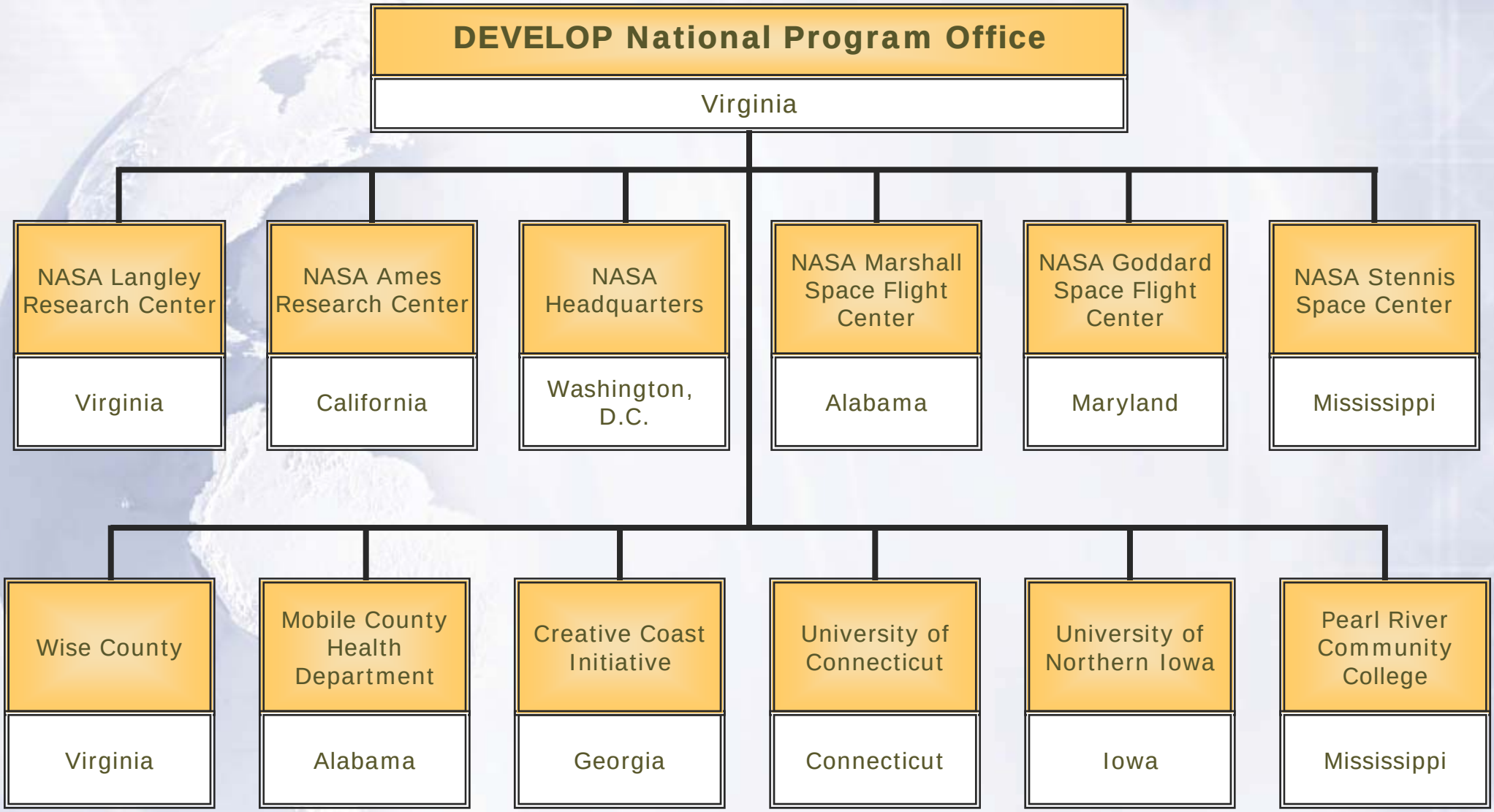
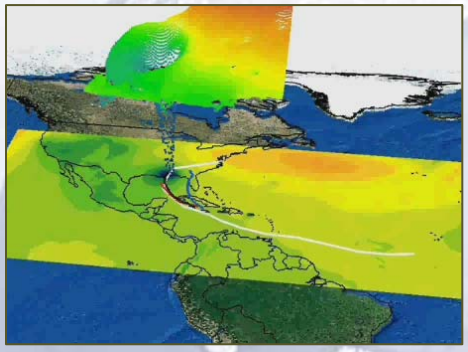
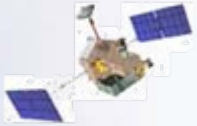
DEVELOP National Organization



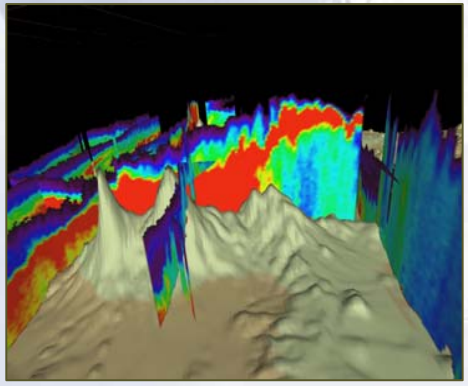
DEVELOP Science Projects Lifecycle

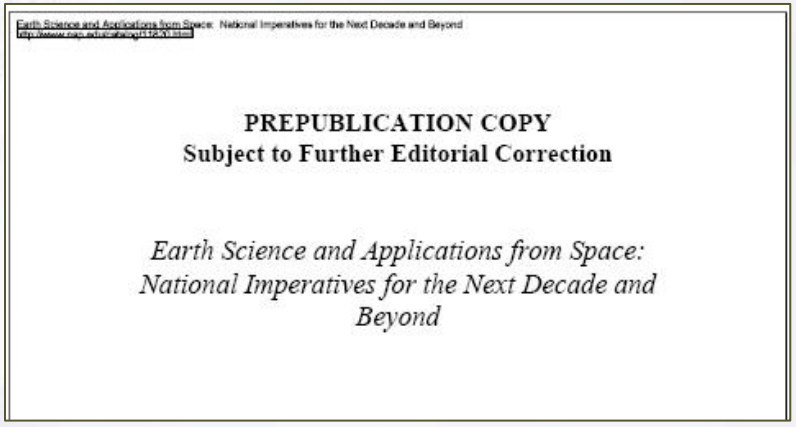
1. Identify Need
2. Partnerships
3. Conduct Project
4. Present Results
5. Expand Recognition





1. Work with scientists and Applied Sciences program managers to identify needs and establish project
2. Establish partnerships
3. Conduct Earth science projects with science advisor mentorship
4. Present results at national/international science forums
5. Expanded recognition of the societal benefits of the Applied Sciences Program




Earth Science and Applications from Space: National Imperatives for the Next Decade and Beyond

PREPUBLICATION COPY
Subject to Further Editorial Correction

Earth Science and Applications from Space: National Imperatives for the Next Decade and Beyond

Aerosol Climatology

Amanda Ross, Team Alumnus
Jennifer DeWinter, Team Lead
Kim Keith, Team Co-Lead
Brian Tisdale, Data Processing Liaison
Destiney Rainney, Student Researcher
Jonothan Lister, Student Researcher

Aerosol Climatology

- **Community Concerns**
  - International efforts to monitor transboundary air pollution
  - Transport, magnitude and composition of aerosols
  - Impacts of increased industrialization on air quality
  - Impacts of air quality policy implementation and progress in prediction, prevention, and control of poor air quality

- **Purpose**
  - This project evaluates the potential of MODIS data to assess transboundary aerosol trends in support of the 1991 US-Canada Air Quality Agreement

- **Partners**
  - Environmental Protection Agency (EPA)
  - Environment Canada
  - National Park Service (NPS)

Science Advisor

Jim Szykman, PhD
Environmental Protection Agency

Doreen Neil, PhD
NASA Langley Research Center

Chieko Kittaka, PhD
NASA Langley Research Center/SSAI

Air Quality

Aerosol Climatology

Earth System Models

CHRONOS

CMAQ

Aerosol Distribution, Data model, Standard Grid

Data

Earth Observations

MODIS (Terra & Aqua)
Collection 5

AERONET
NAPS/AQS/IMPROVE

CALIPSO Glory
Future missions

AOD, $PM_{2.5/10}$

Rapid Prototyping Products

- MODIS AOD in standard CHRONOS grid, 21 x 21 km
- Correlation analysis of AERONET and regridded MODIS AOD
- Trends analysis of MODIS AOD over the US-Canada border region for the years 2000-2006
- Trends analysis of ground $PM_{2.5/10}$ over the US-Canada border region for years 2000-2006

Partners

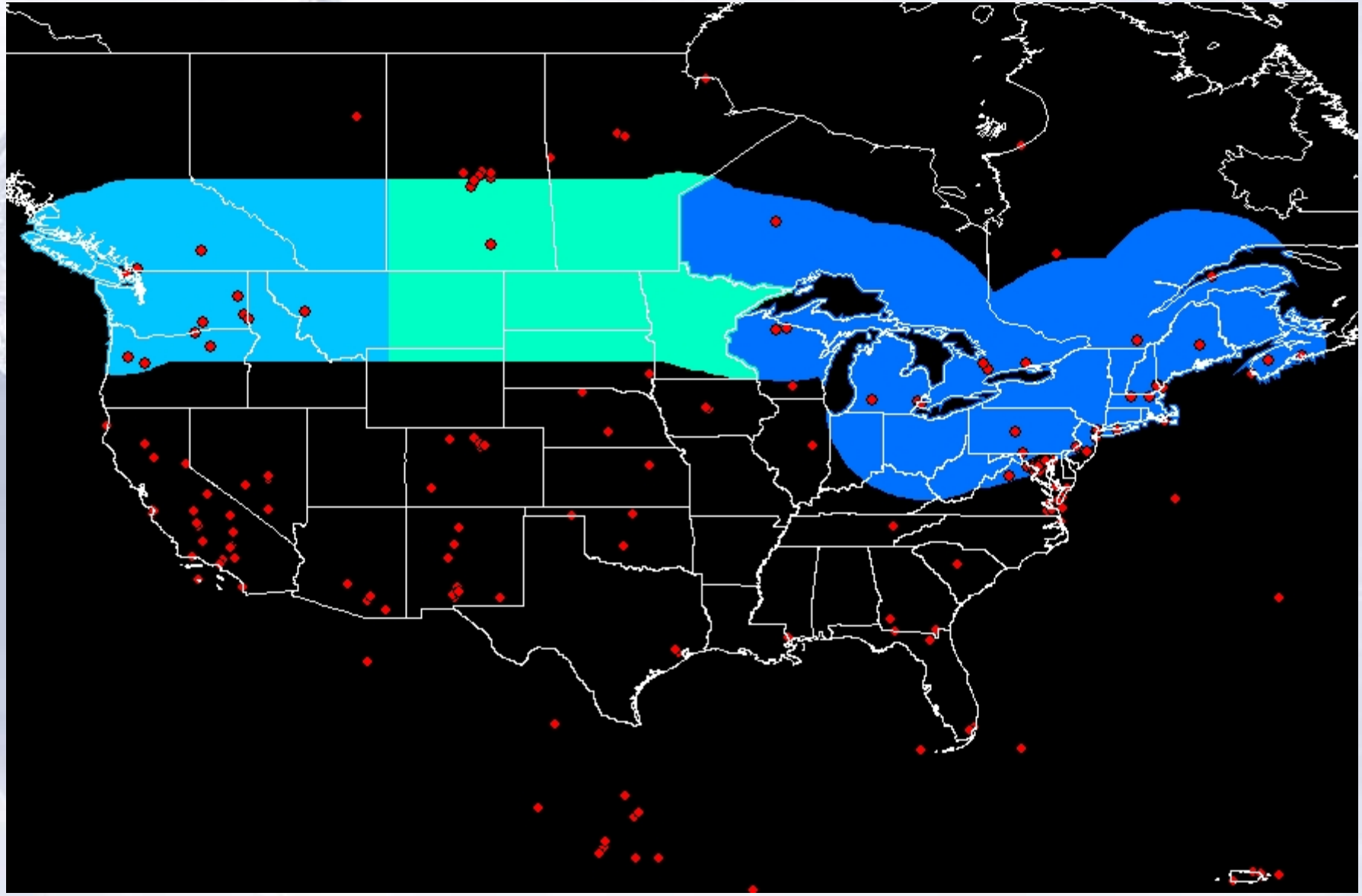
Environment Canada

Value & Benefits

- Long term aerosol climatologic record for transboundary aerosol trends analyses
- Convey utility of MODIS AOD for analysis of air quality policy impacts over time.

Uncertainty Analysis and Scientific Rigor

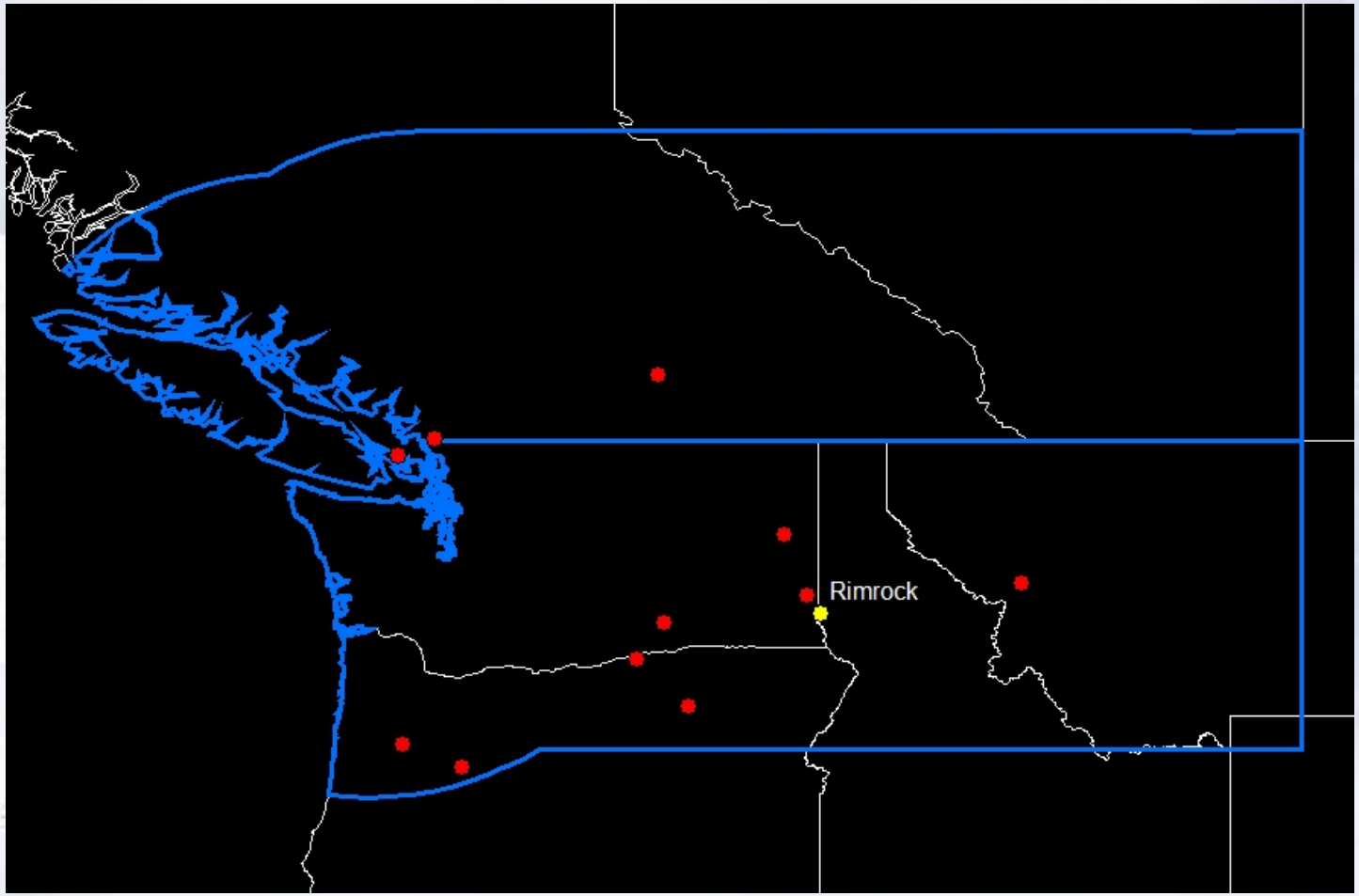
Study Regions



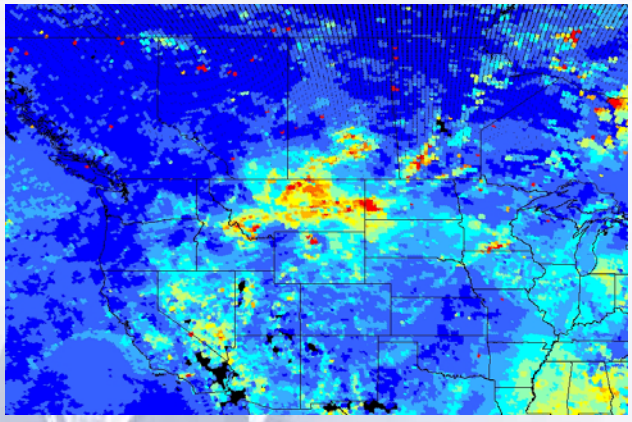
AERONET-MODIS Correlation

Methods:

- 50x50 km sq spatial coincidence surrounding AERONET site
- Temporal coincidence +/- 30 minutes satellite overpass



Average MODIS AOD (Terra): Jun-Aug 2000-2006



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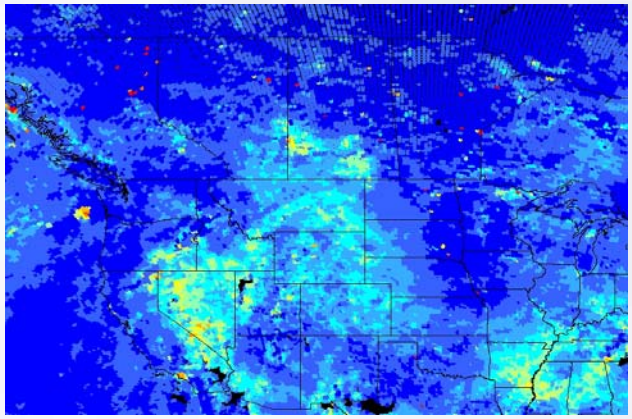

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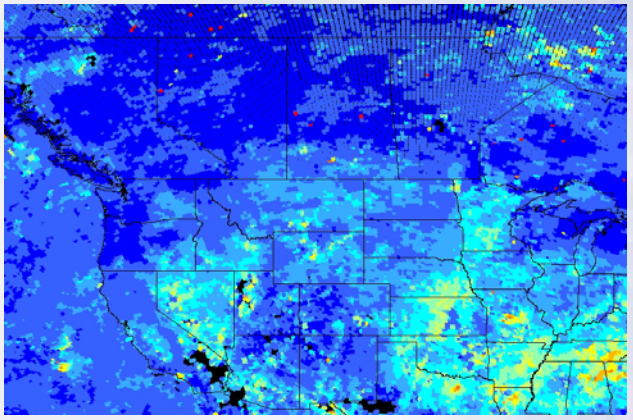

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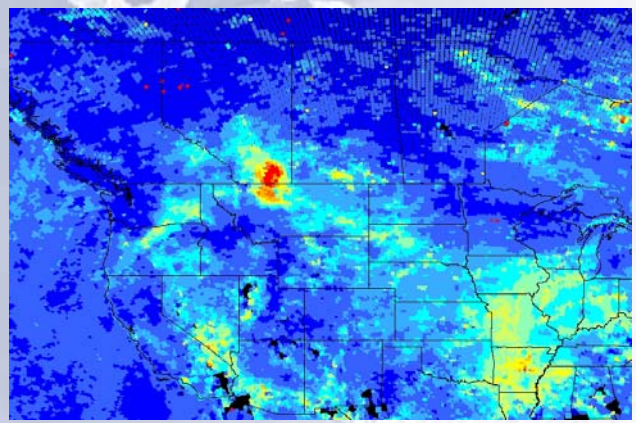

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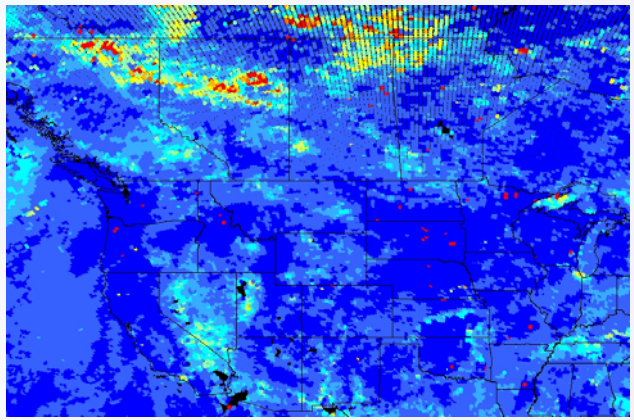

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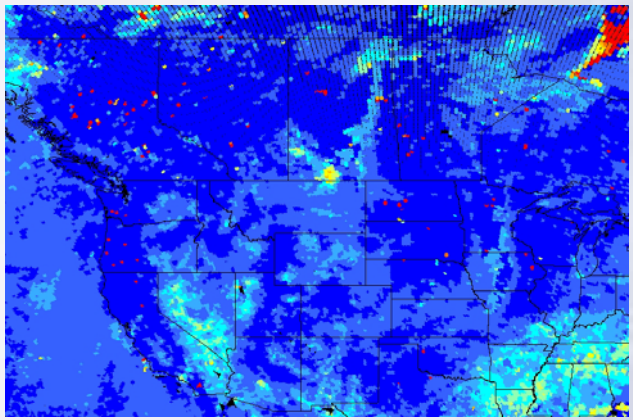
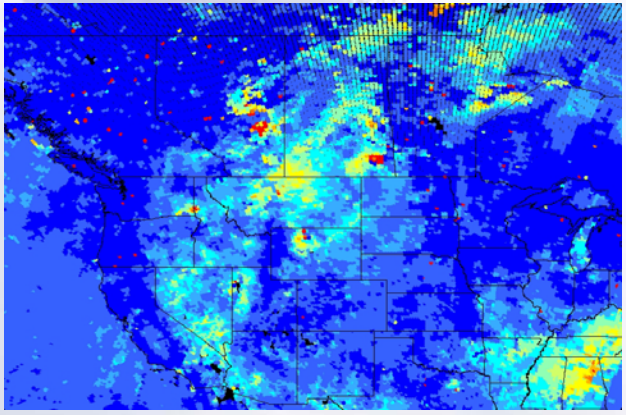
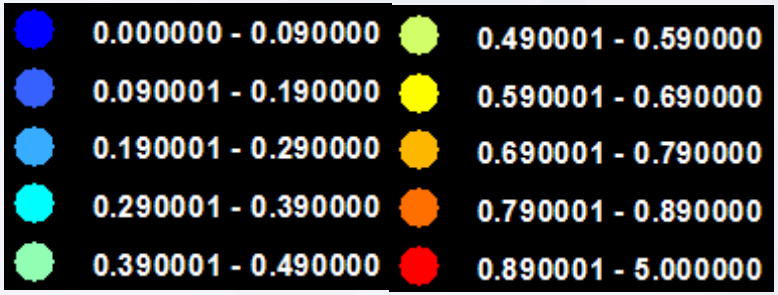


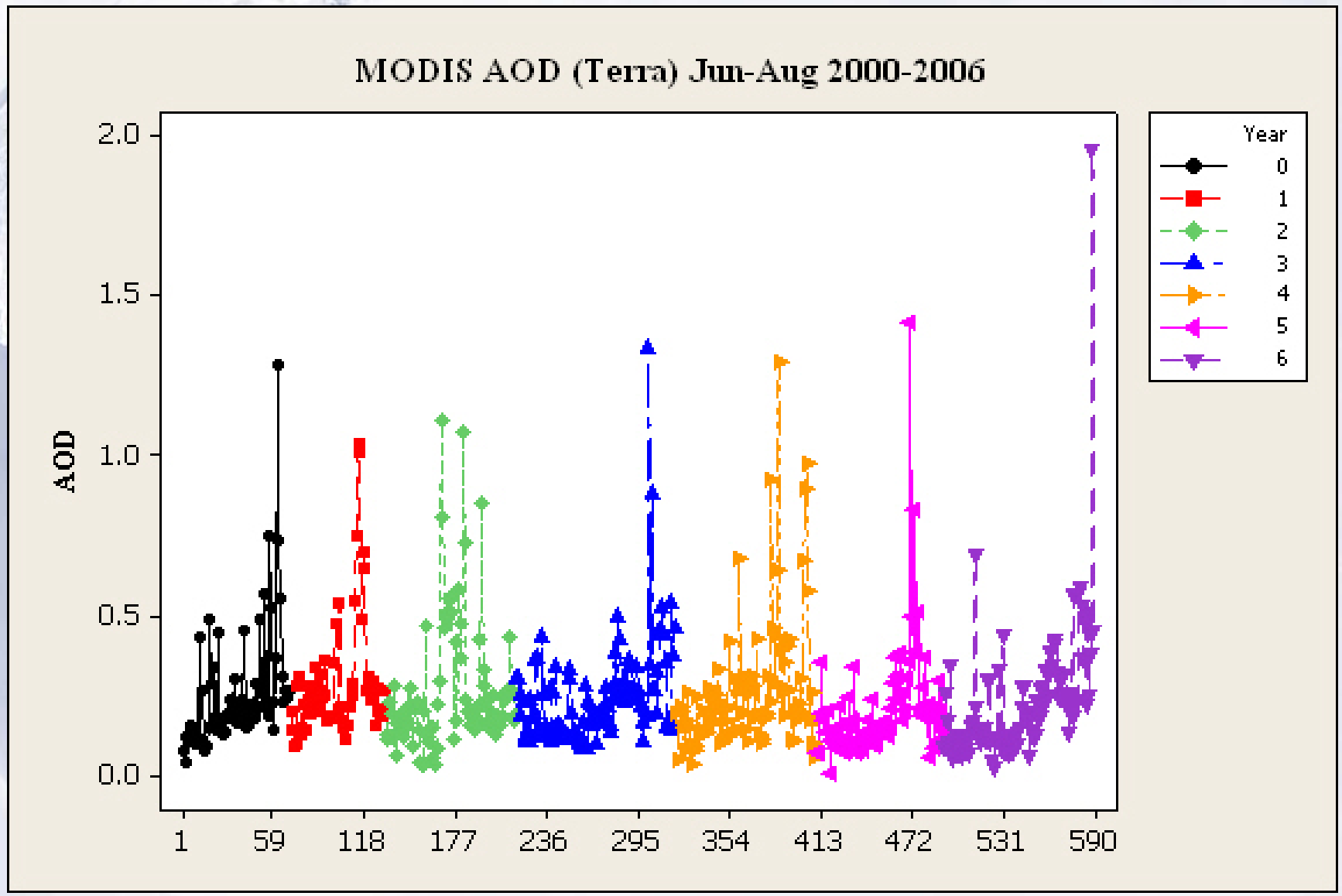
2005



2006



Summer Time Series at Rimrock



Challenges/Next Steps

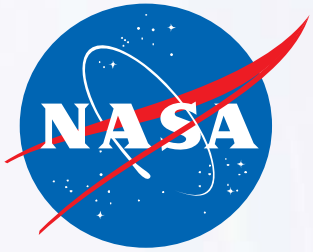
- Continuation of MODIS/AERONET Correlation in Regions 2-4
- Assess MODIS trends at AERONET sites
- Extension of MODIS AOD trends analysis beyond AERONET sites
- Consider/Compare ground PM trends to MODIS AOD at select locations
- CALIPSO
- Future NASA Missions and Sustainability

Applications of Environmental Remote Sensing to Air Quality & Public Health Workshop

May 8-9, 2007

- Action Item: “State of Knowledge” paper
- DEVELOP literature review: a foundation
- Sundar Christopher and Pawan Gupta: “State of Knowledge” table, review and contributions to the air quality aspects
- Call for public health review and contributions
- Internal review panel needed
- *Environmental Health Perspectives* and new online journal, *Geospatial Health*

Questions?



http://develop.larc.nasa.gov

Data Distribution
Dealing with Outliers