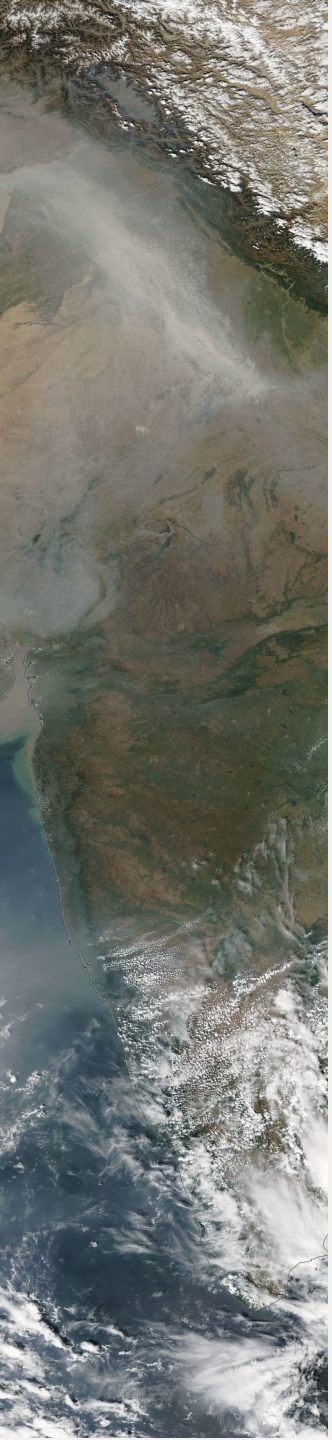

National Aeronautics and
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ARSET
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Satellite Aerosol Validation

Pawan Gupta

Satellite Remote Sensing of Air Quality: Data, Tools, and Applications

Tuesday, May 23, 2017 – Friday, May 26, 2017
Indian Institute of Tropical Meteorology, Pune, India

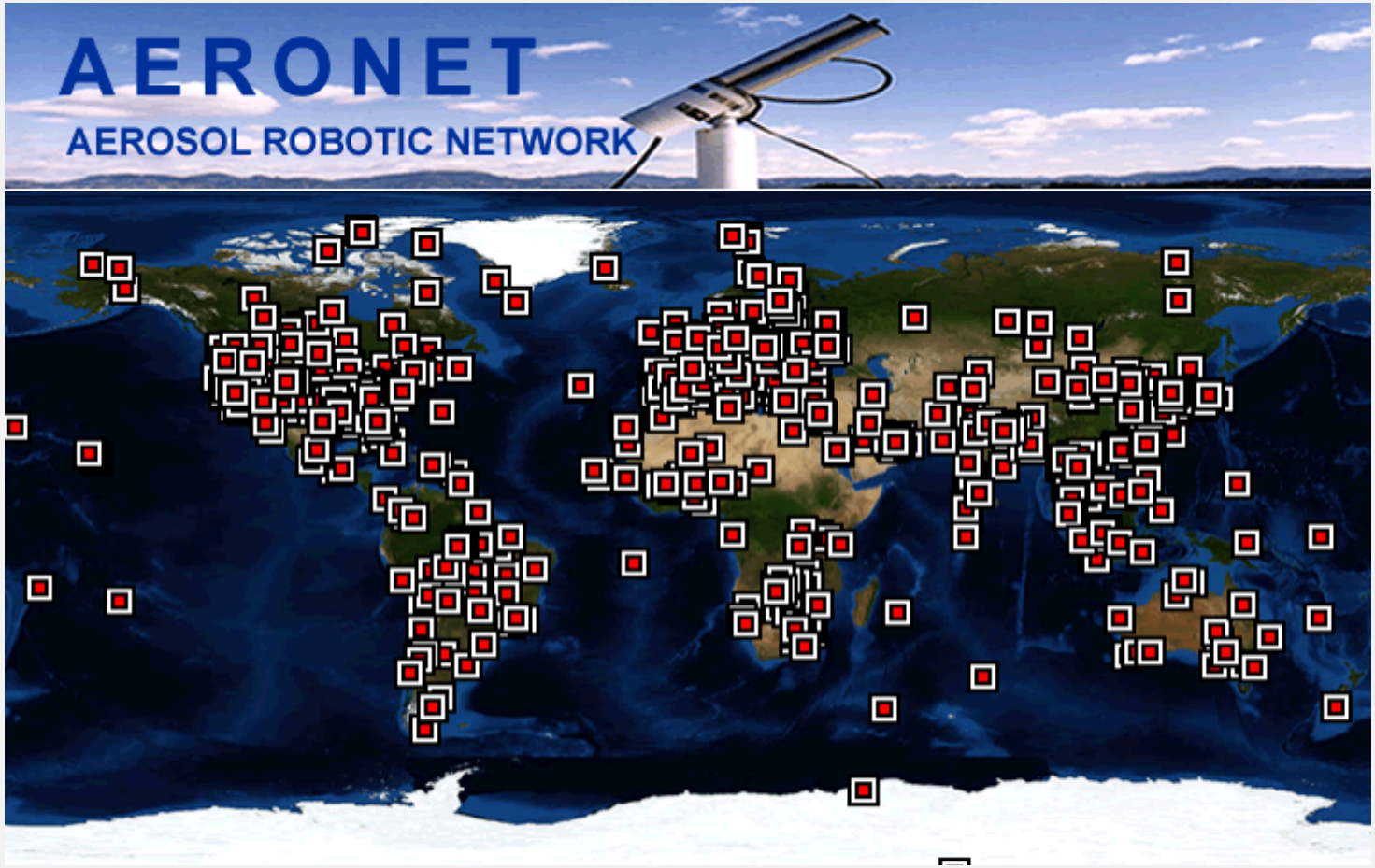
Objectives

By the end of this presentation, you will learn to:

- Validate satellite derived aerosol optical depth
- List the uncertainties in the MODIS aerosol product
- Access data and tools for validating satellite aerosol products

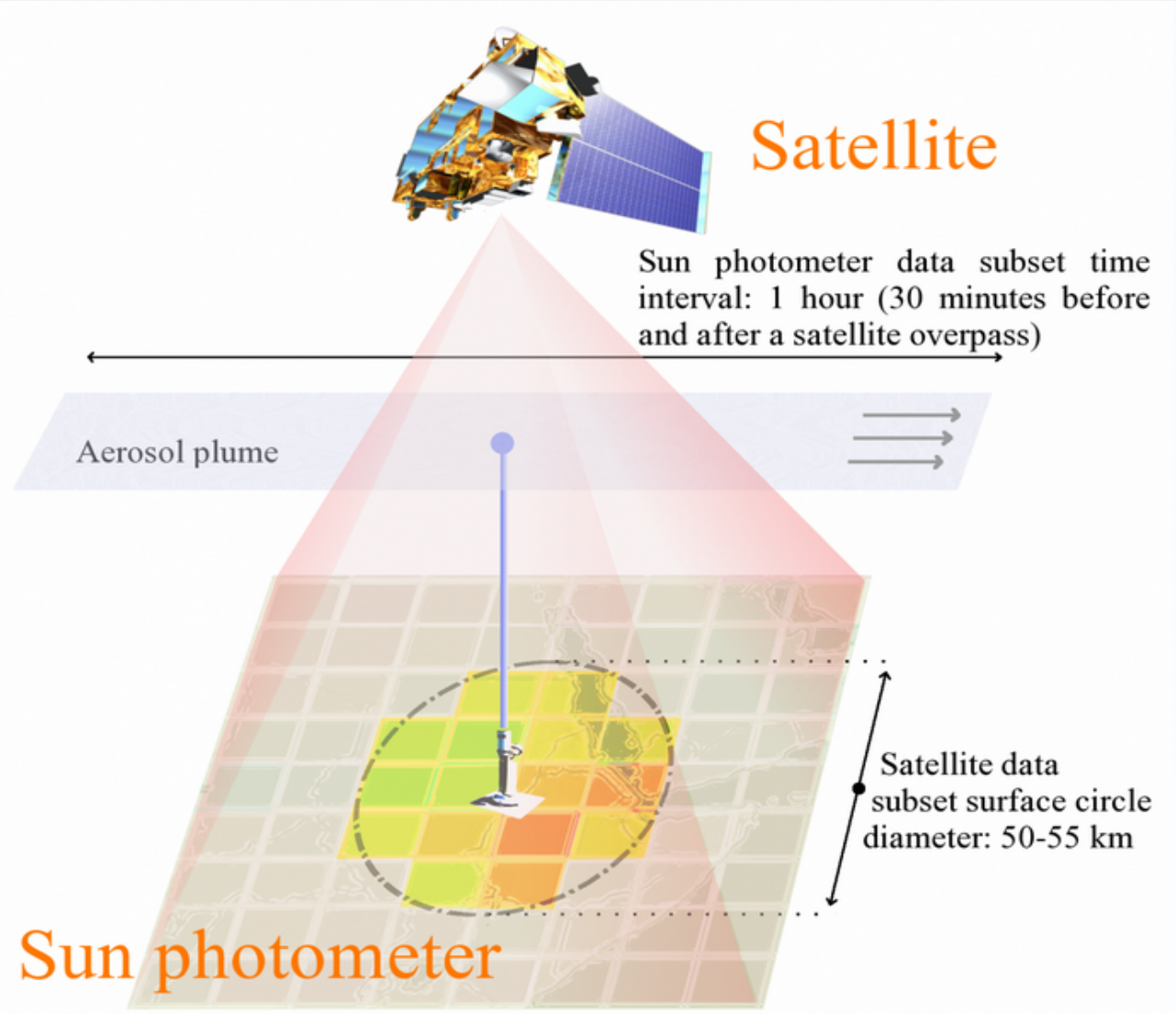
AERONET

http://aeronet.gsfc.nasa.gov/



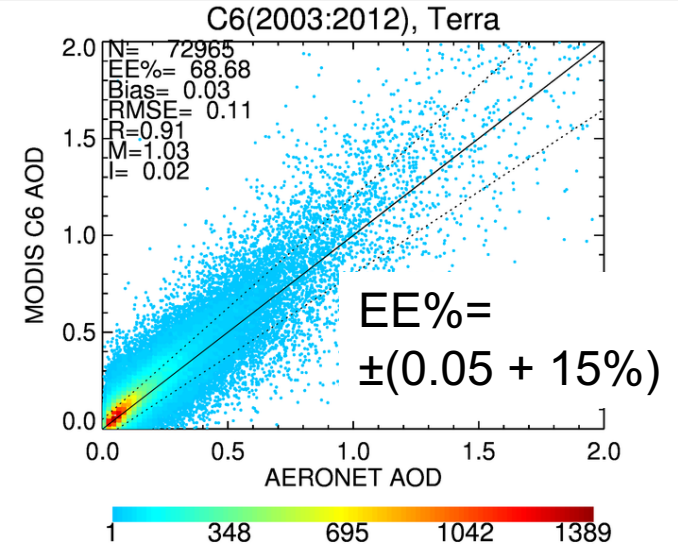
Serves as a validation tool for satellite air quality products

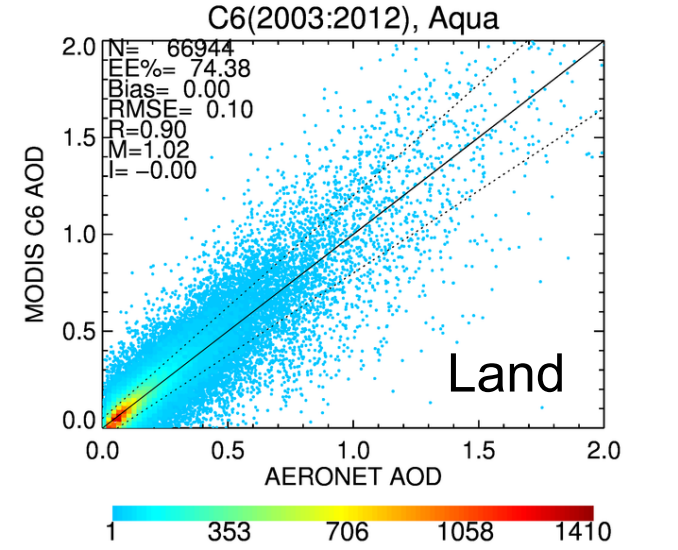
Spatial and Temporal Collocation

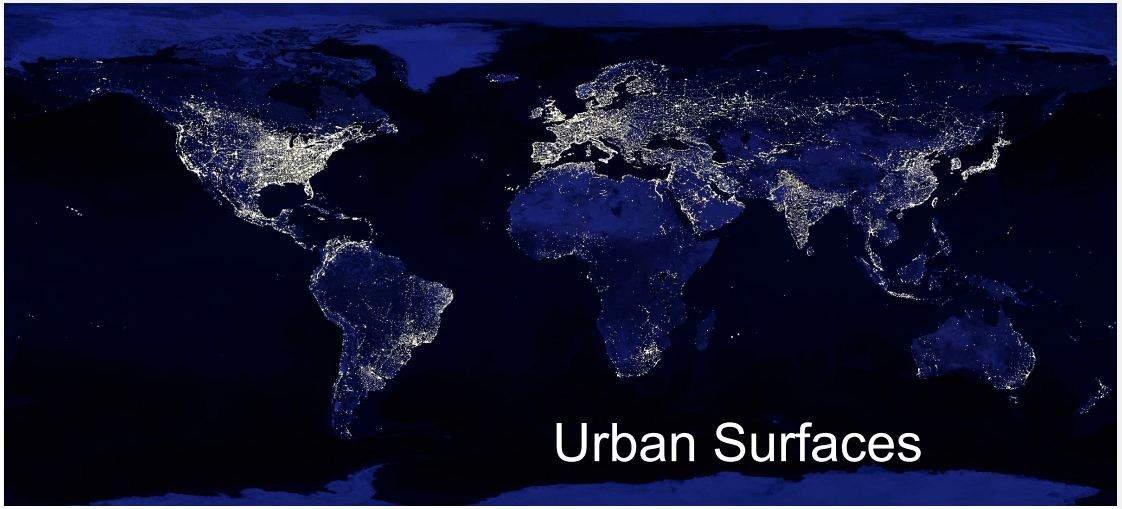


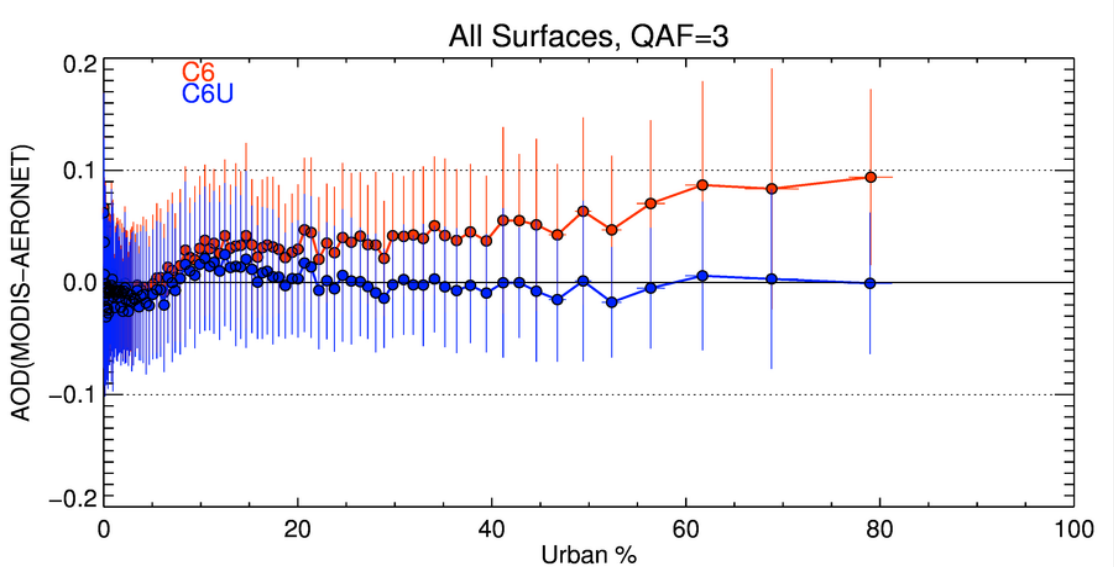
Petrenko et al., 2012

MODIS Dark Target AOD Validation





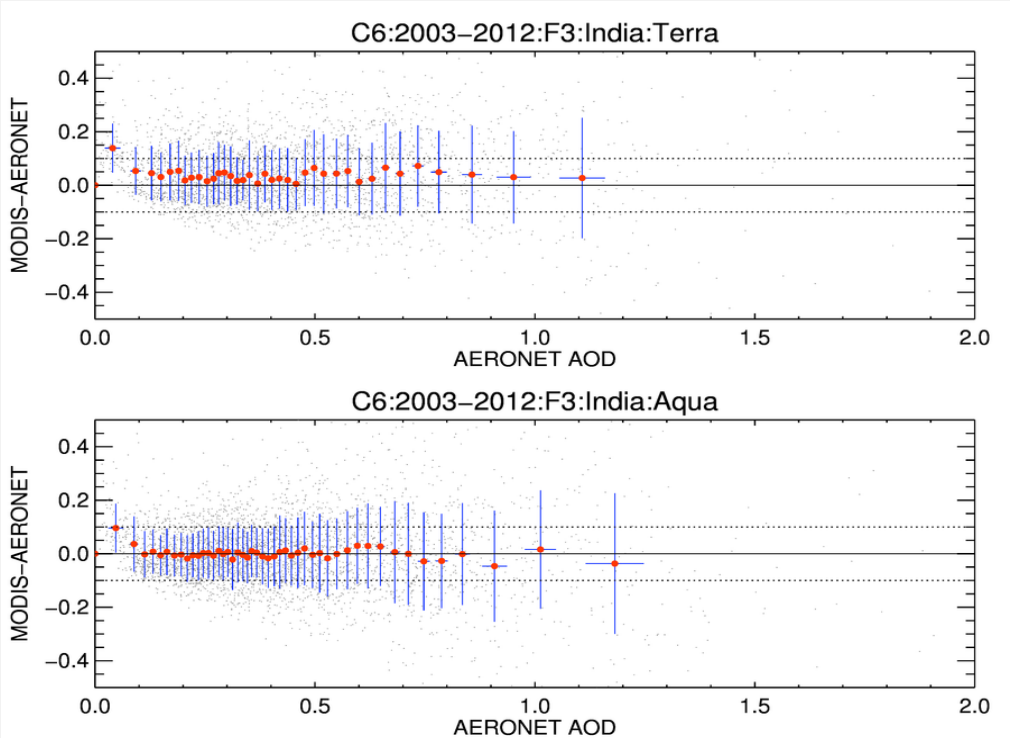




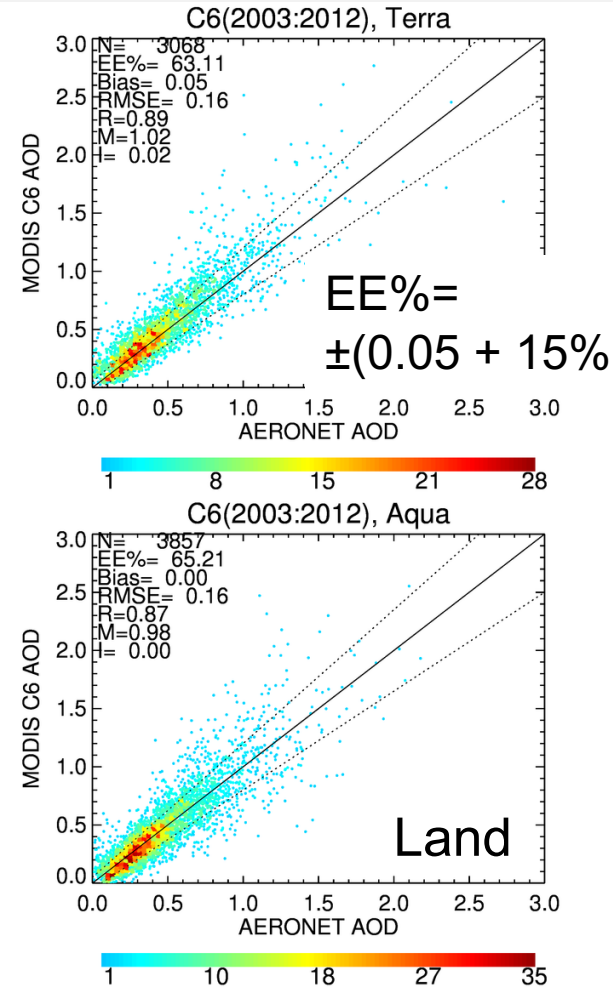
Source: Gupta et al., 2016

AERONET Comparisons with Aqua & Terra

Includes all stations in the region (Indian subcontinent)

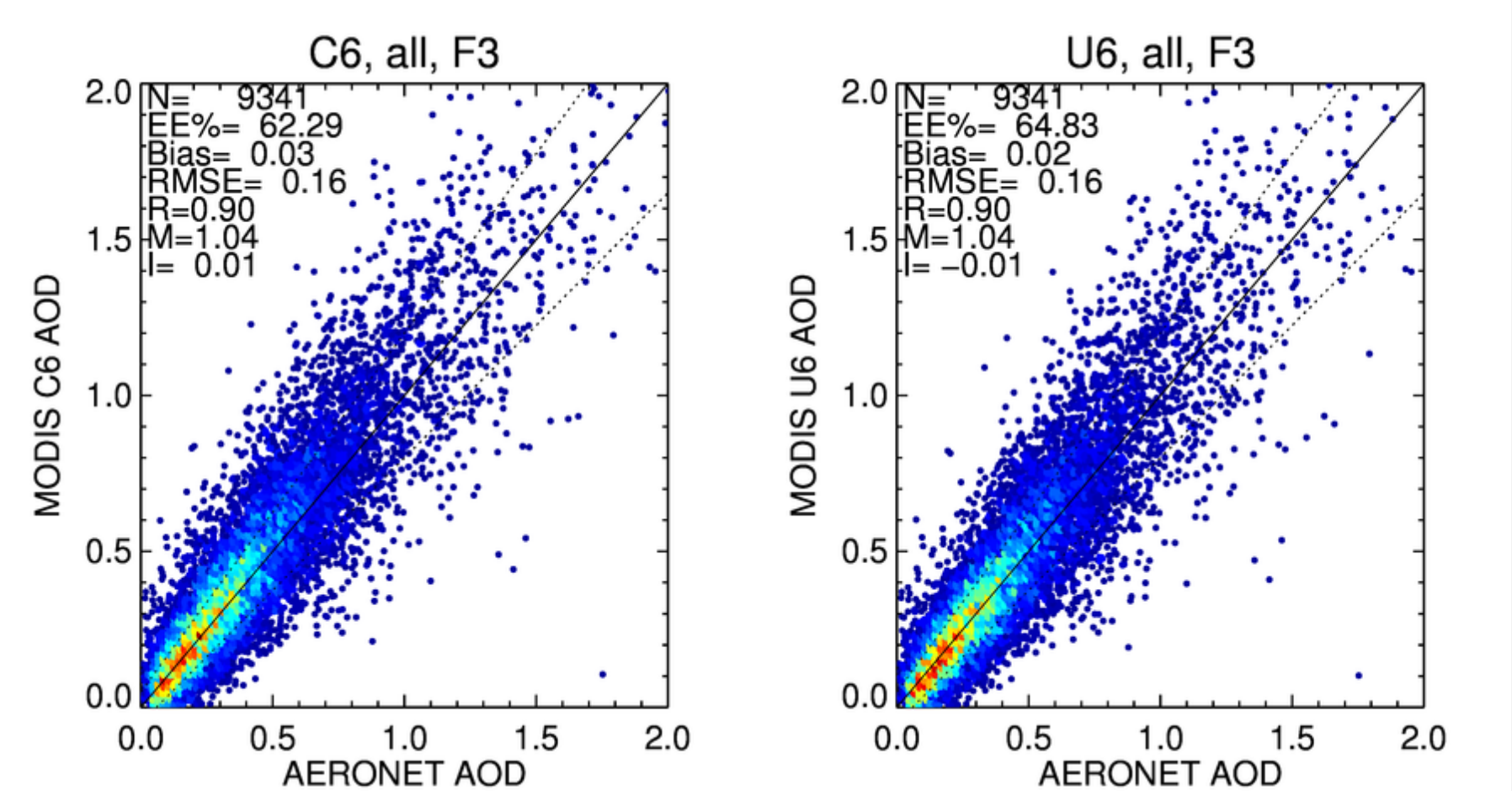


Terra is biased (0.05) high whereas Aqua has close to zero bias



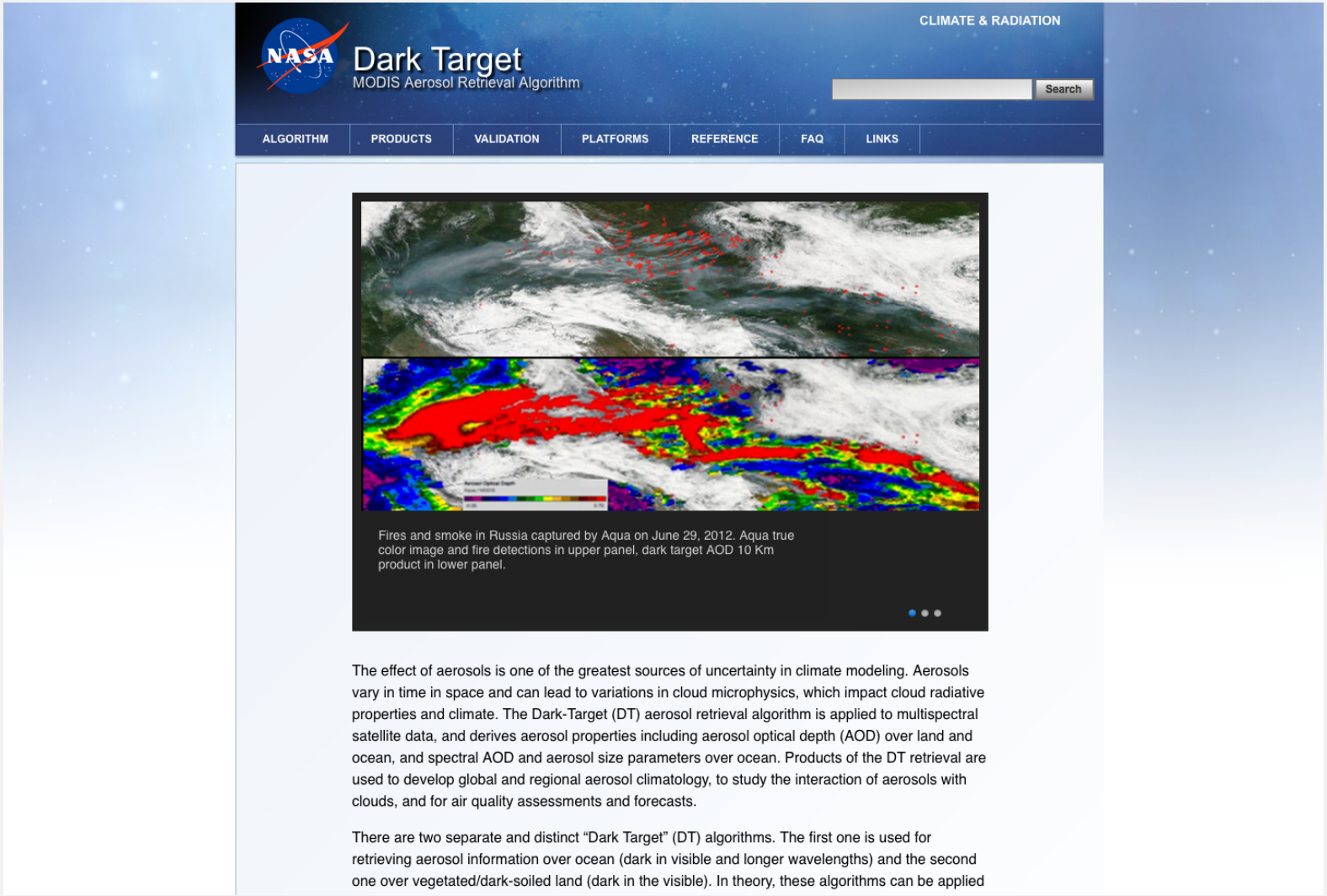
MODIS Dark Target AOD Validation

MODIS – Aqua for Asia



Dark Target

http://darktarget.gsfc.nasa.gov/



MODIS Dark Target AOD Uncertainties

MODIS 10 Km Product

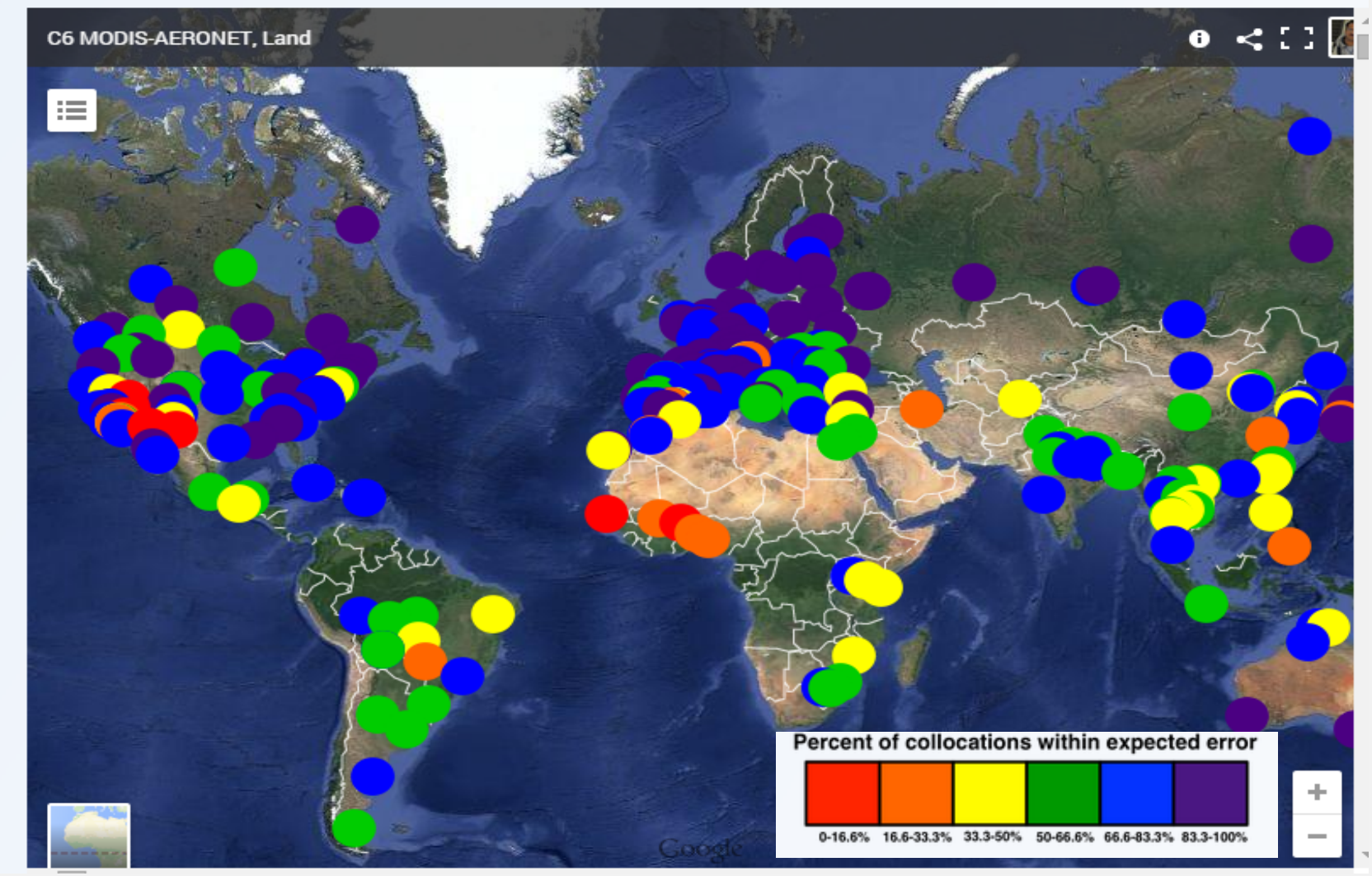
	Collection 5		Collection 6 (Interim Values)	
	Ocean	Land	Ocean	Land
Aqua	+/- (0.03 + 5% of τ)	+/-(0.05 + 15% of τ)	(-0.02 - 10% of τ) (+0.04 + 10% of τ)	+/-(0.05 + 15% of τ)
Terra	+/- (0.03 + 5% of τ)	+/-(0.05 + 15% of τ)	Data not yet available	Data not yet available

MODIS 3 km Product Uncertainty Values for Collection 6 (Interim Values)

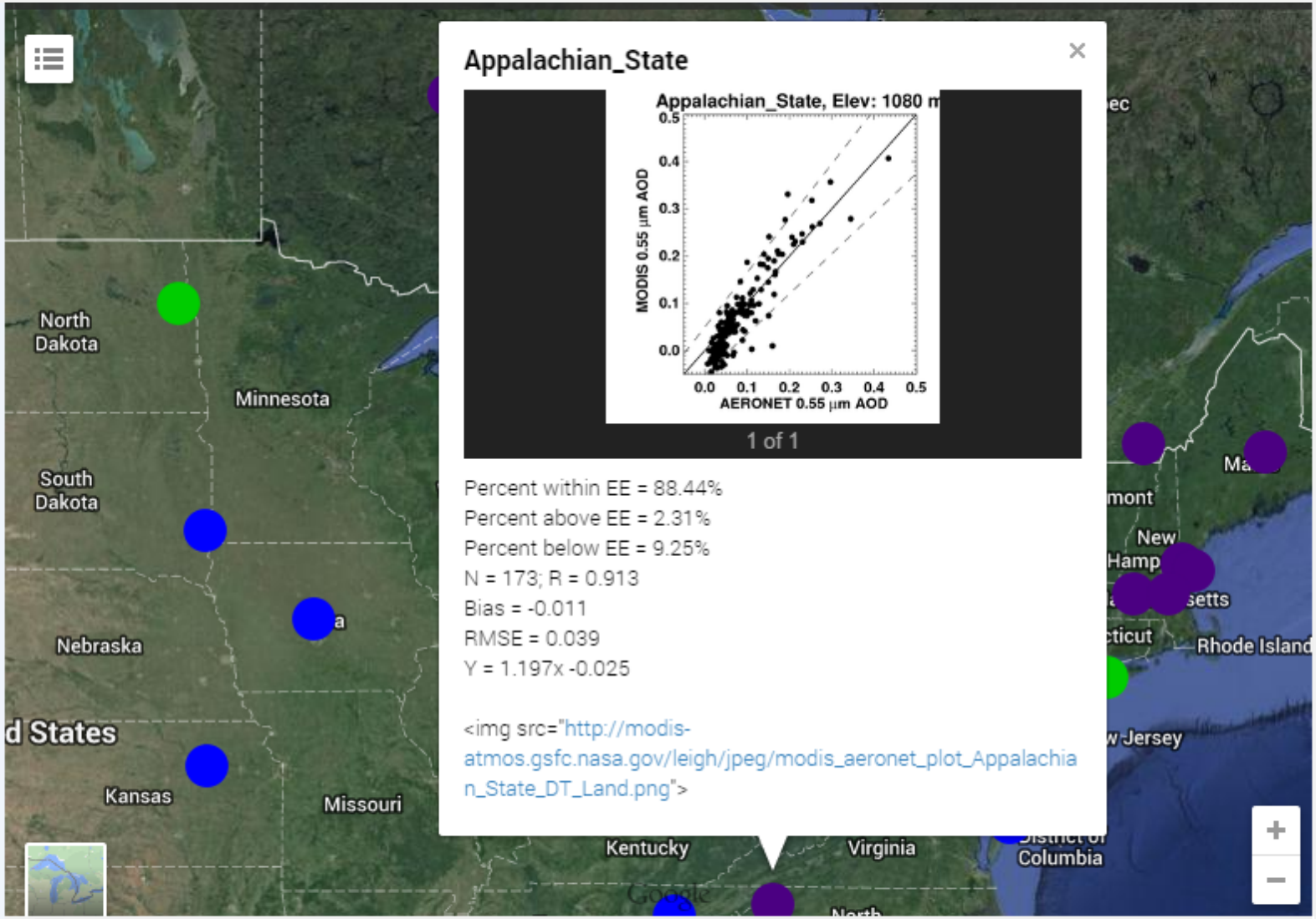
	Ocean	Land
Aqua	+/- (0.04 + 5% of τ)	+/- (0.05 + 20% of τ)
Terra	Data not yet available	Data not yet available

Validation Maps

http://darktarget.gsfc.nasa.gov/

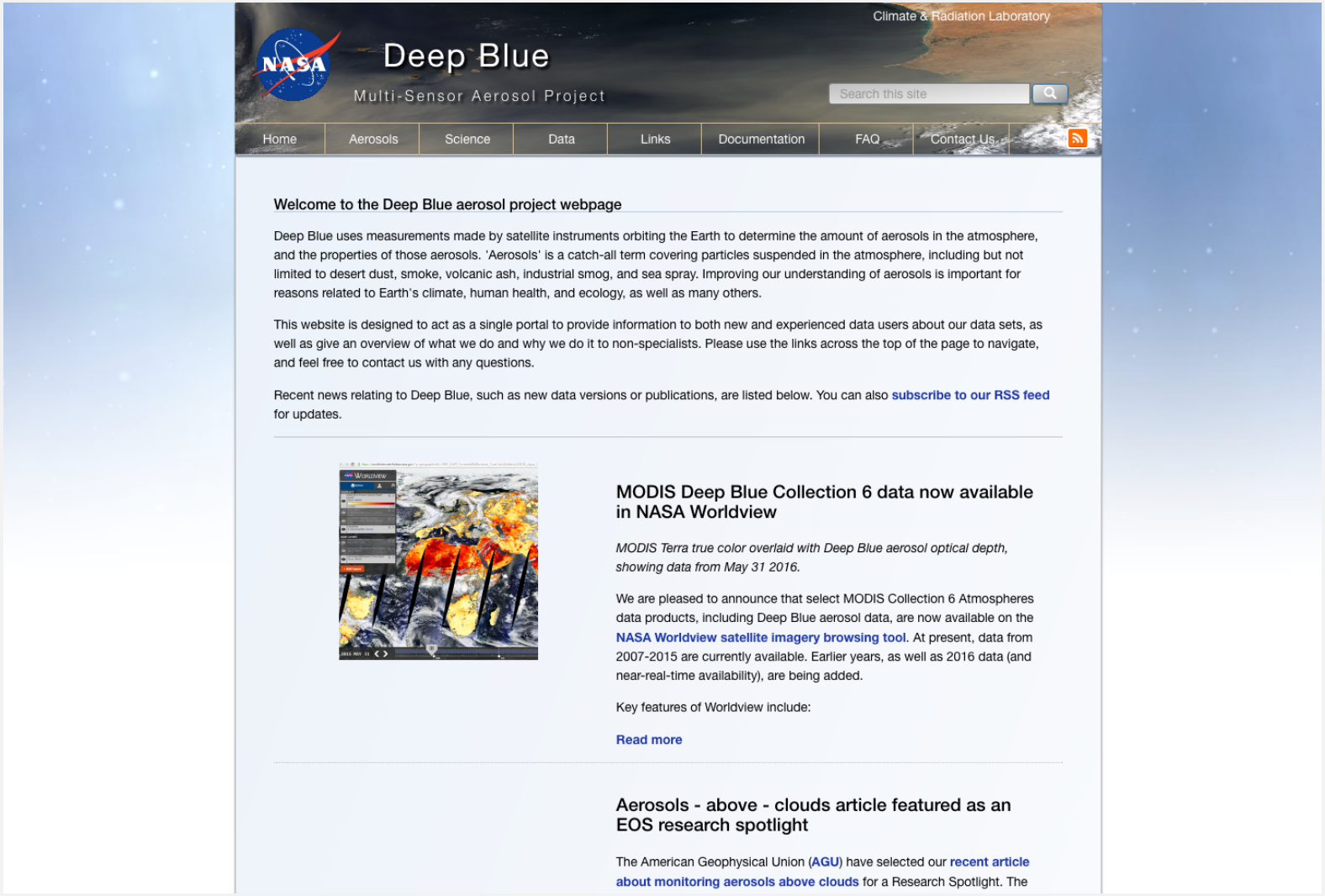


Scatter Plot



Deep Blue Product

http://deepblue.gsfc.nasa.gov



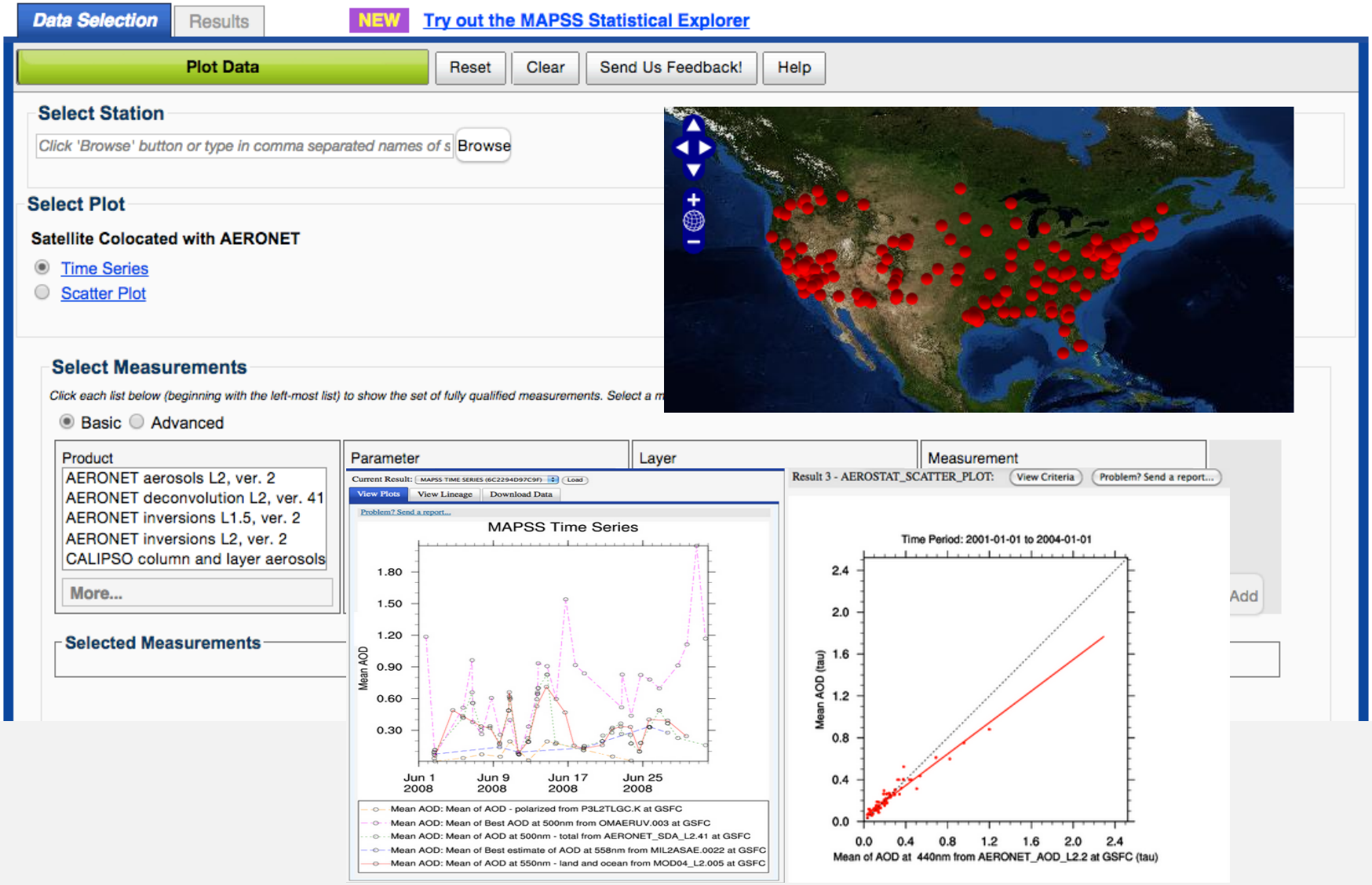
MAPSS

Multi-sensor Aerosol Products Sampling System

- Giovanni instances
- Used to evaluate the quality of satellite retrievals
- MAPSS allows you to compare AERONET data with coincident satellite data
- Quick and effective way to evaluate the quality of the satellite retrieval at particular locations for a range of dates or seasons
- Data from MODIS & MISR
  - Satellite-AERONET Inter-Comparison: http://giovanni.gsfc.nasa.gov/mapss/
  - Multi-Sensor Statistics: http://giovanni.gsfc.nasa.gov/mapss_explorer/

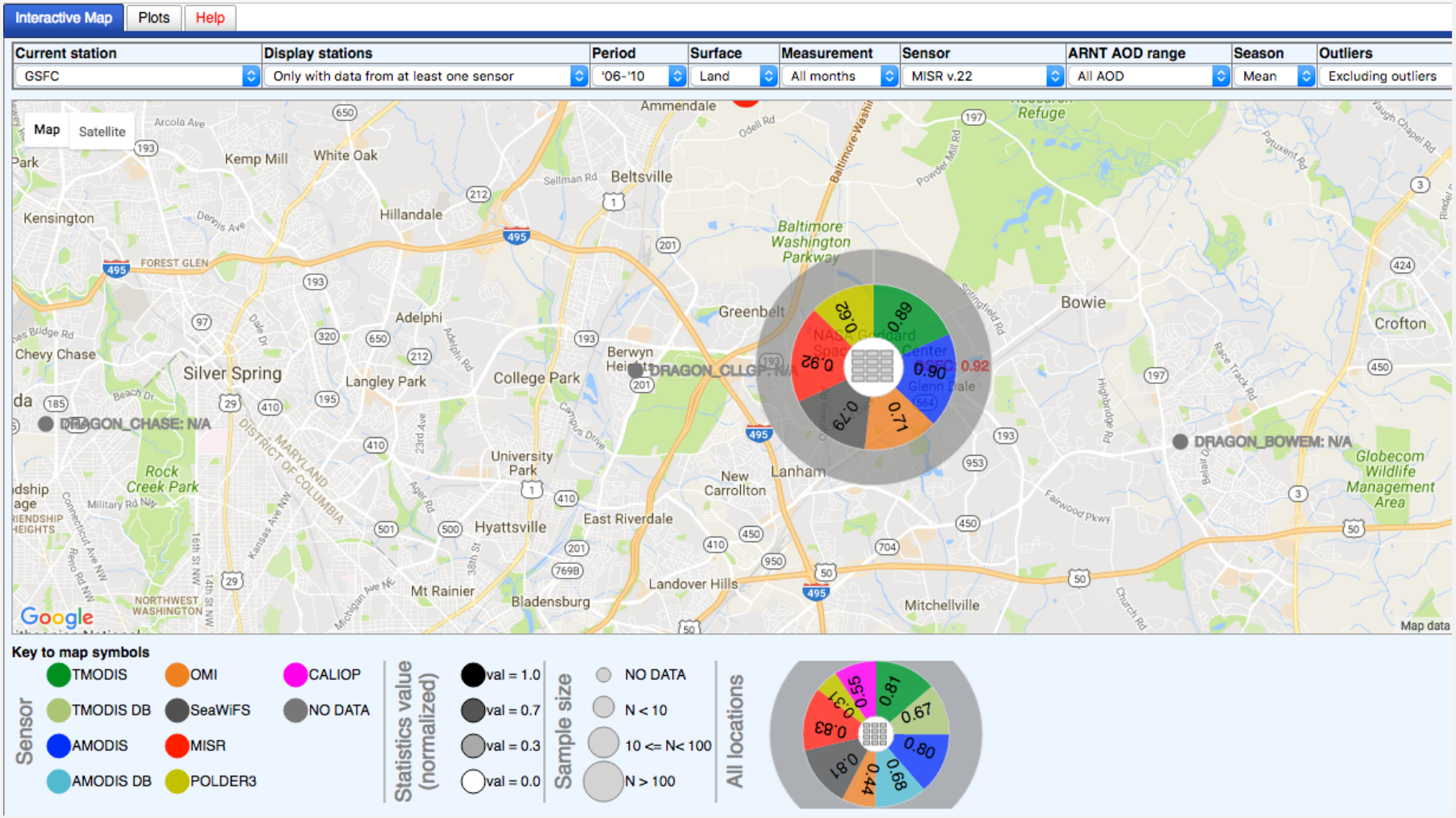
MAPSS: Multi-sensor Aerosol Products Sampling System

This user interface is used to obtain selected parameter statistics from the MAPSS database for a chosen location and time period. Time Series Plot is the available service. Plot output is rendered as a graph and is also available in ASCII format.

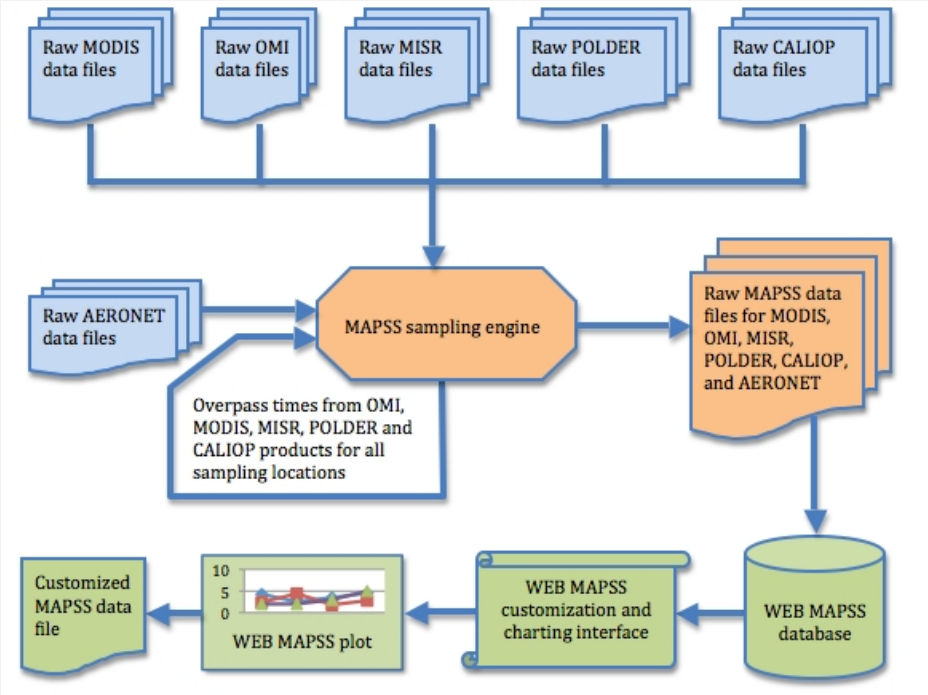


MAPSS Statistical Explorer

http://giovanni.gsfc.nasa.gov/mapss_explorer/



MAPSS – Further Reading



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Published Validation Results

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