Satellite Aerosol Validation

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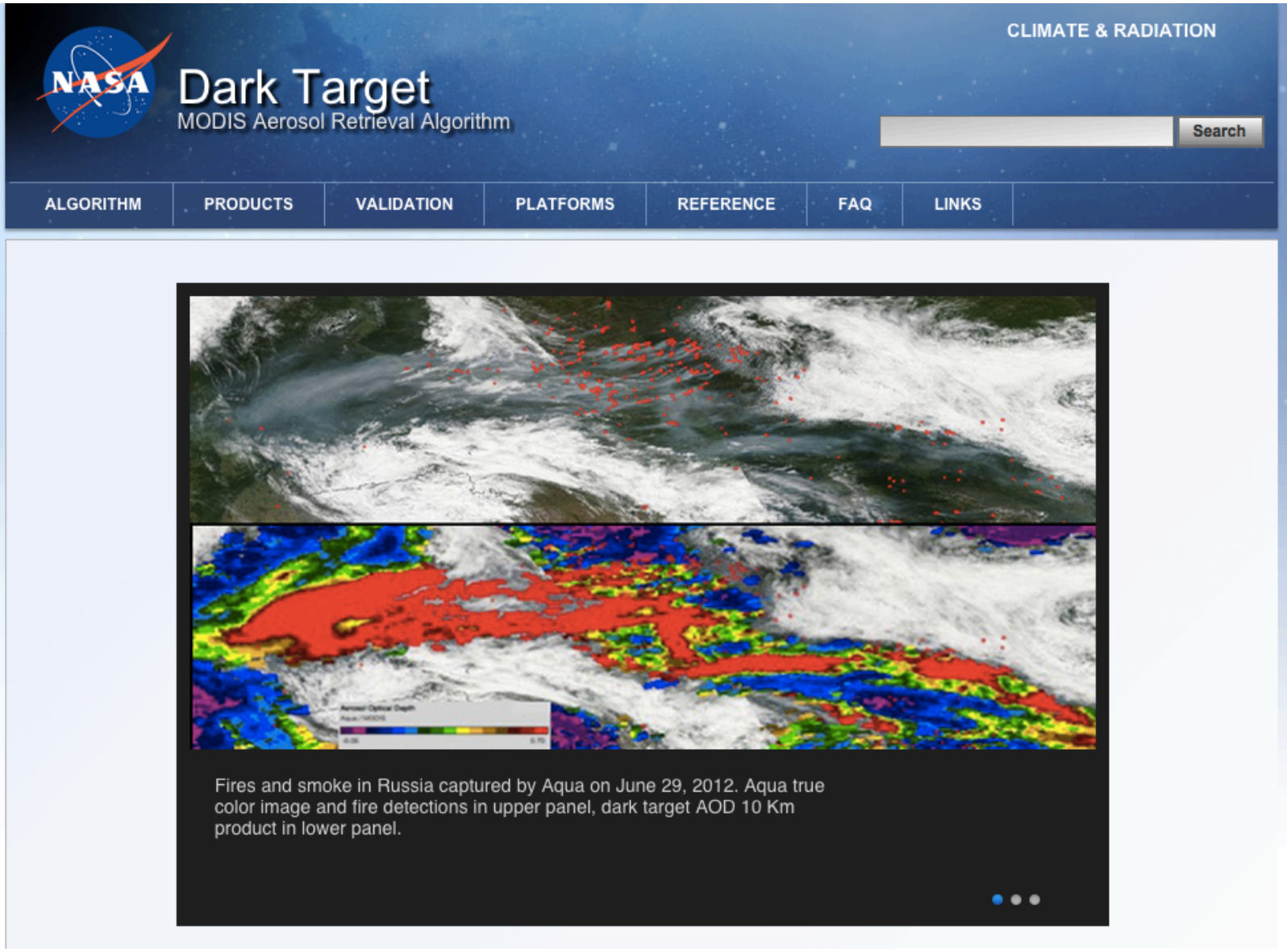
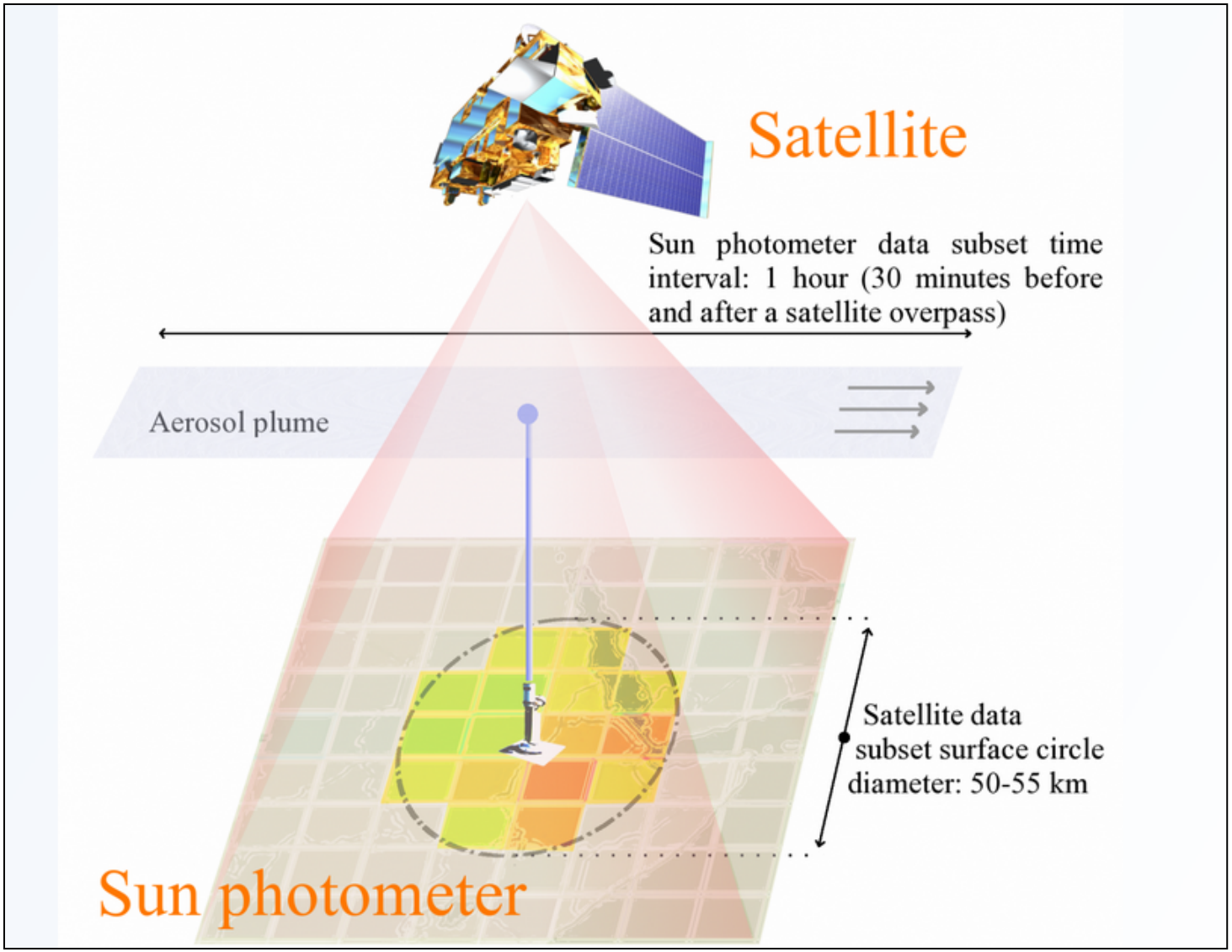
NASA ARSET- AQ – GEPD & SESARM, Atlanta, GA
September 1-3, 2015

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



Spatial and Temporal Collocation



MODIS Dark Target AOD Uncertainties

MODIS 10 Km Product

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

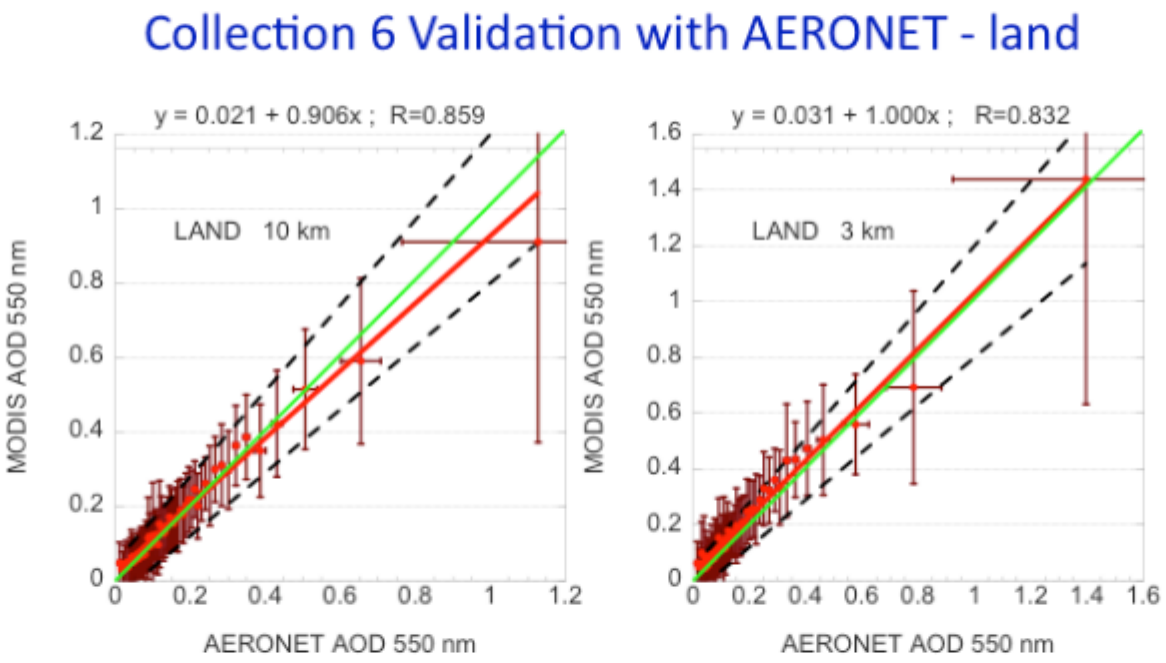
MODIS 3 km Product Uncertainty Values for Collection 6 (Interim Values)

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

Preliminary Validation Results of Collection 6

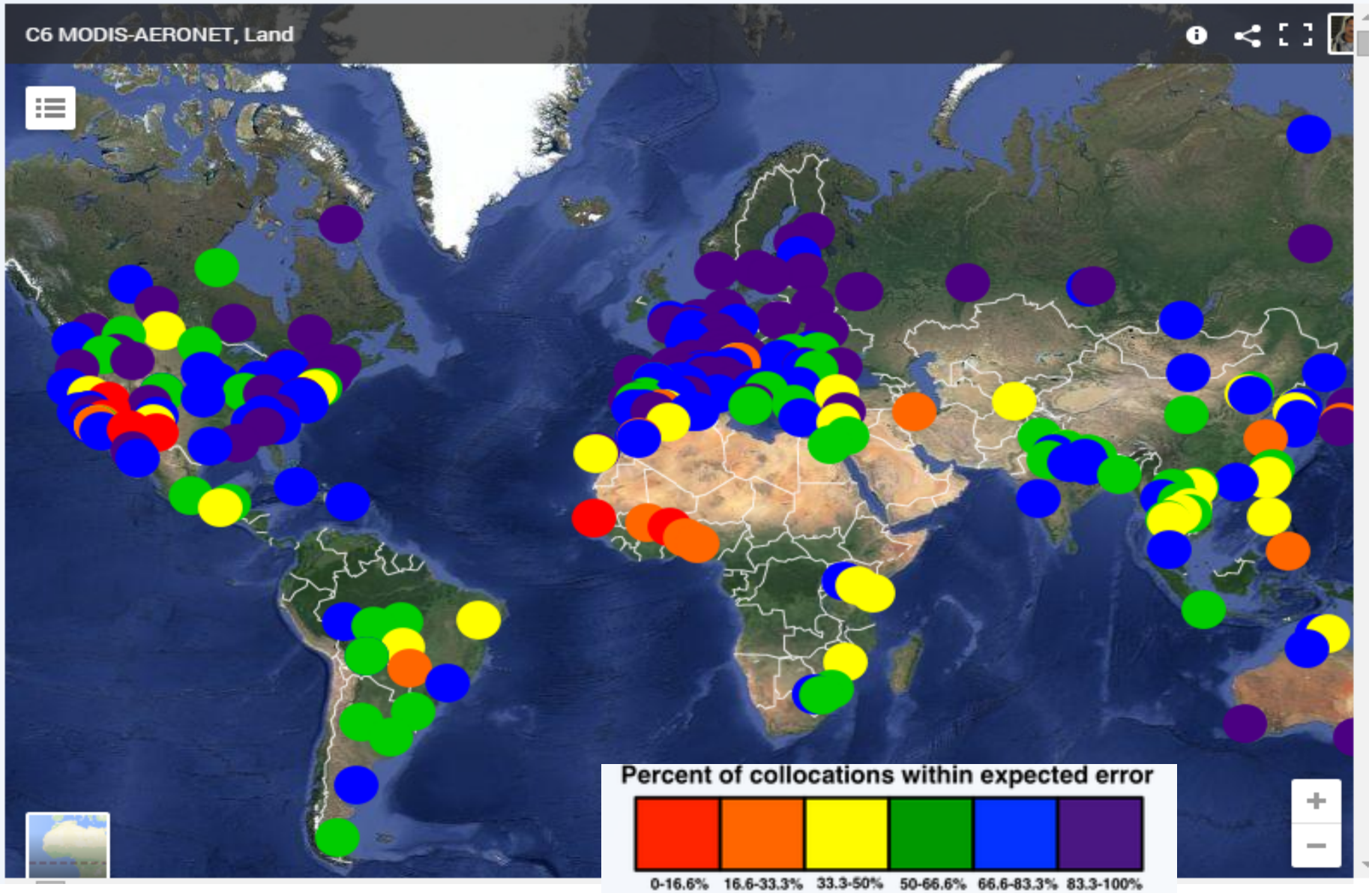
Validation Plots for Collection 6 Products

Collection 6 preliminary validation results are based on only 6 months of data: June and July of 2003, 2008 and 2010.

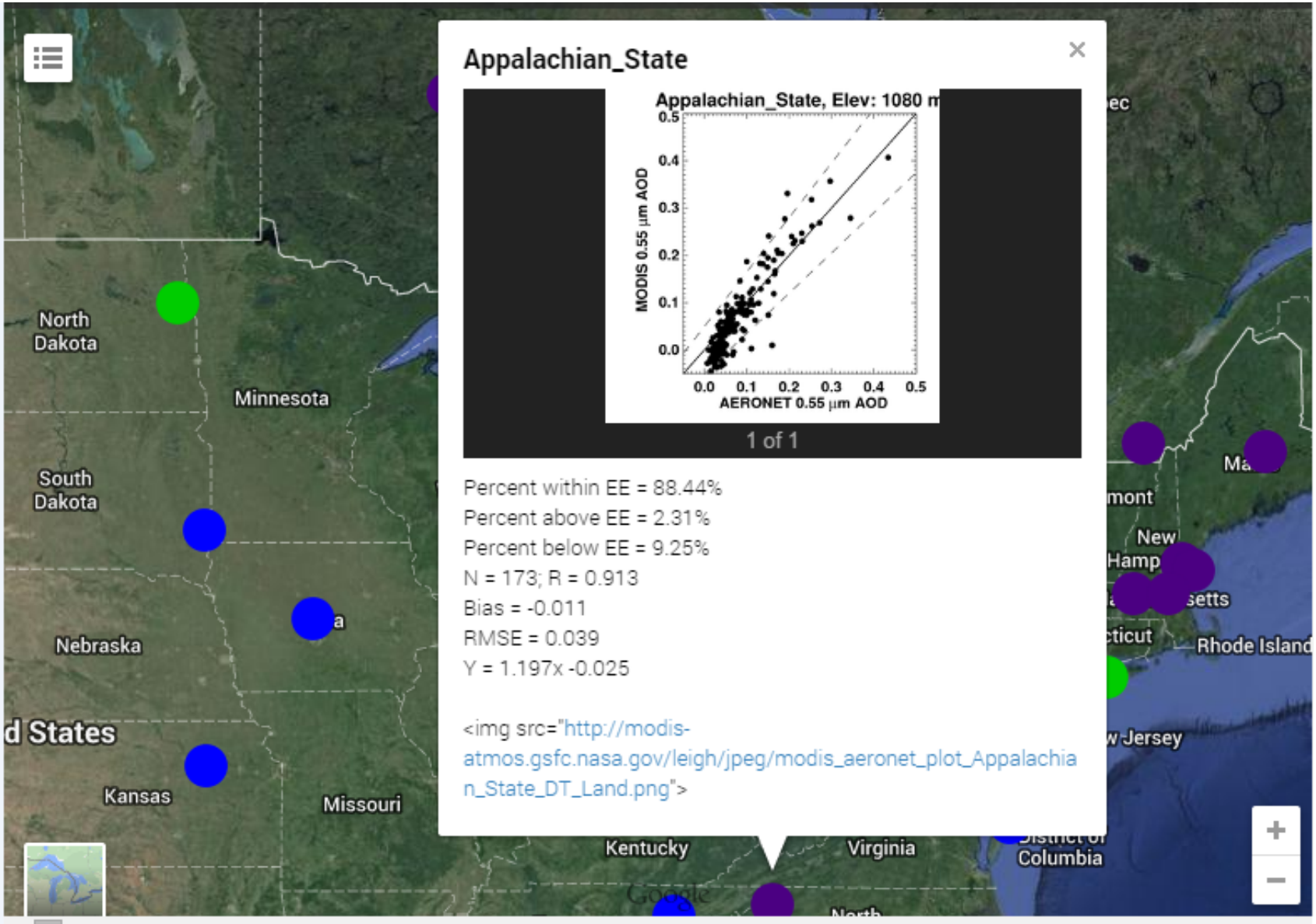


- **Both 10 km and 3 km products are well correlated with AERONET**
- **3 km shows slight high bias and a bit more uncertainty**

Validation Maps



Scatter Plot



Other Online Tools

MAPSS

Multi-sensor Aerosol Products Sampling System (MAPSS)

- Giovanni instances
- Used to evaluate the quality of a 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 season.
- 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.

Data Selection | Results

NEW Try out the MAPSS Statistical Explorer

Plot Data | Reset | Clear | Send Us Feedback! | Help

Select Station

Click 'Browse' button or type in comma separated names of s | Browse

Select Plot

Satellite Colocated with AERONET

- (•) Time Series
- ( ) Scatter Plot

Select Measurements

Click each list below (beginning with the left-most list) to show the set of fully qualified measurements. Sel

(•) Basic ( ) Advanced

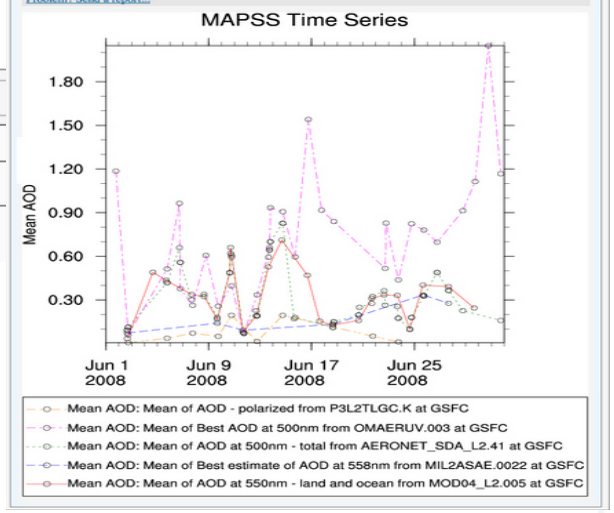
Product	Parameter	Layer	Measurement
AERONET aerosols L2, ver. 2			
AERONET deconvolution L2, ver. 41			
AERONET inversions L1.5, ver. 2			
AERONET inversions L2, ver. 2			
CALIPSO column and layer aerosols			
More...			

Selected Measurements

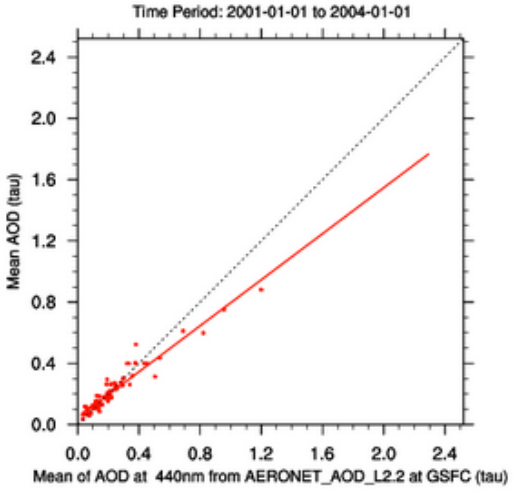
Current Result: MAPSS TIME SERIES (6C2294D97C9F) | Load

View Plots | View Lineage | Download Data

Problem? Send a report...

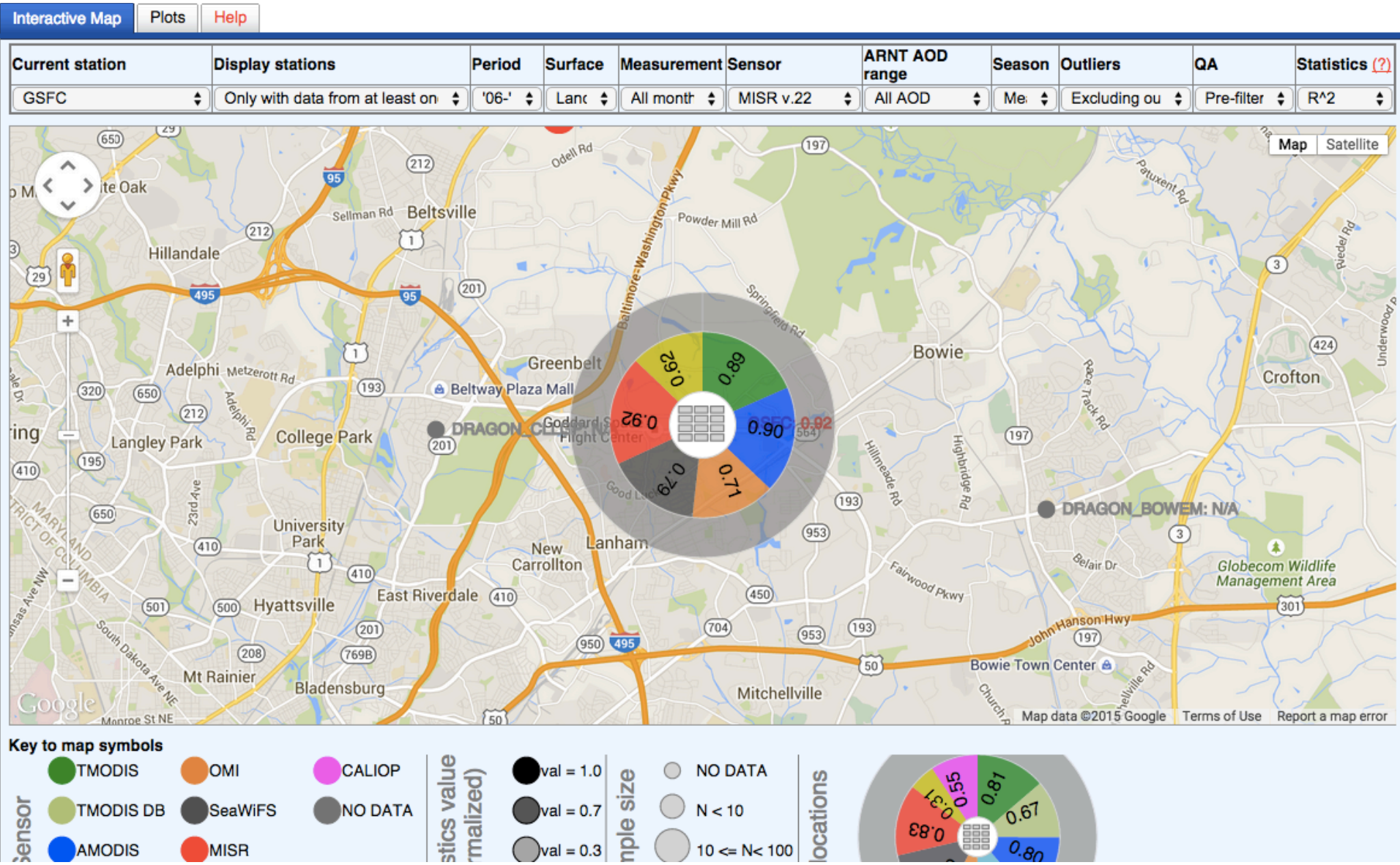


Result 3 - AERONET_SCATTER_PLOT: | View Criteria | Problem? Send a report...



MAPSS Statistical Explorer

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



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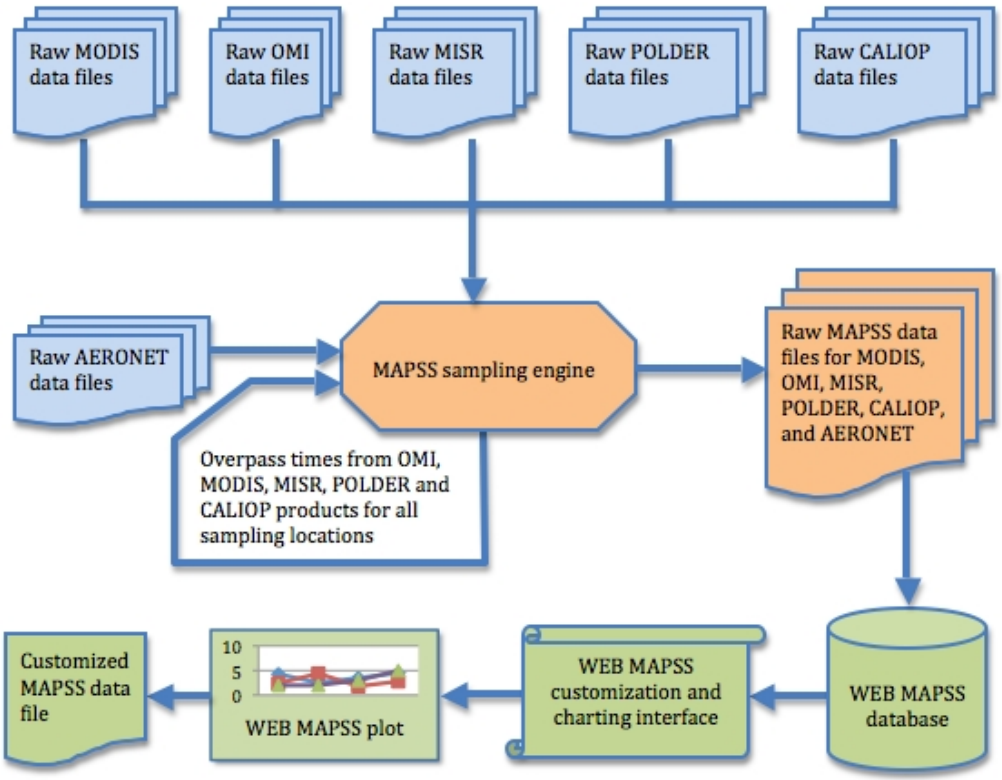

Petrenko, M., and C. M. Ichoku. 2013. "Coherent uncertainty analysis of aerosol measurements from multiple satellite sensors." Atmos. Chem. Phys., 13 (14): 6777-6805 [10.5194/acp-13-6777-2013] [Journal Article/Letter]

Petrenko, M., C. M. Ichoku, and G. Leptoukh. 2012. "Multi-sensor Aerosol Products Sampling System (MAPSS)." Atmospheric Measurement Techniques, 5 (5): 913-926 [10.5194/amt-5-913-2012] [Journal Article/Letter]

Some Published Validation Papers

Levy, R. C., Mattoo, S., Munchak, L. A., Remer, L. A., Sayer, A. M., Patadia, F., & Hsu, N. C.. (2013). The Collection 6 MODIS aerosol products over land and ocean. Atmospheric Measurement Techniques, 6, 2989–3034. doi:10.5194/amt-6-2989-2013

Remer, L. A., Mattoo, S., Levy, R. C., & Munchak, L. A.. (2013). MODIS 3 km aerosol product: algorithm and global perspective. Atmospheric Measurement Techniques, 6, 1829–1844. doi:10.5194/amt-6-1829-2013

Sayer, A. M., N.-Y. C. Hsu, C. Bettenhausen, and M.-J. Jeong. 2013. "Validation and uncertainty estimates for MODIS Collection 6 “Deep Blue” aerosol data." J. Geophys. Res. Atmos., 118 (14): 7864-7872 [10.1002/jgrd.50600

Sayer, A. M., L. A. Munchak, N.-Y. C. Hsu, et al. 2014. "MODIS Collection 6 aerosol products: Comparison between Aqua's e-Deep Blue, Dark Target, and “merged” data sets, and usage recommendations." J. Geophys. Res.-Atmos, 119 (24): 13,965-13,989 [10.1002.2014JD022453]