

Joint Accuracy Assessment of Aerosol Retrievals from Multiple Satellite Sensors and GEOS-5 model

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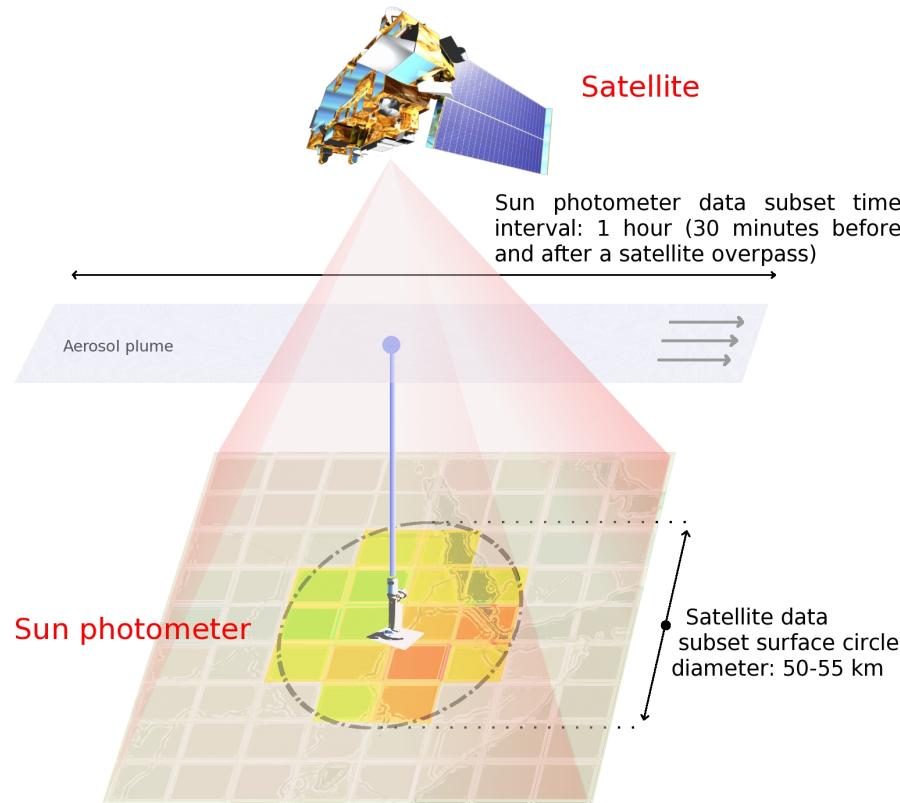
¹ NASA Goddard

² ESSIC UMD

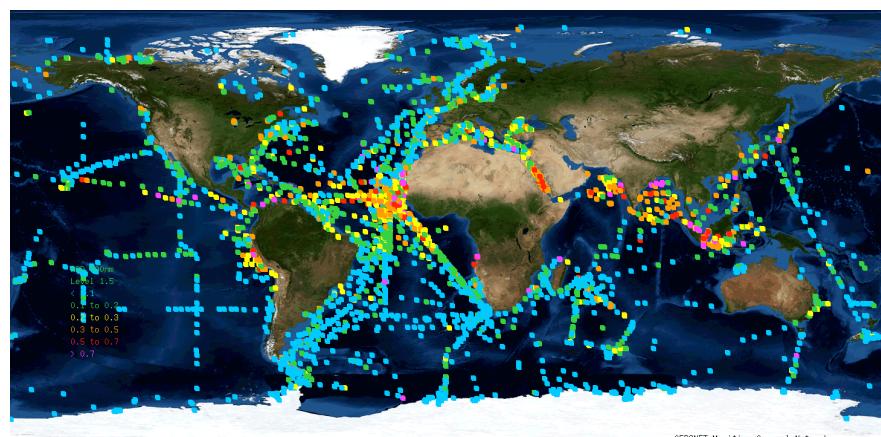
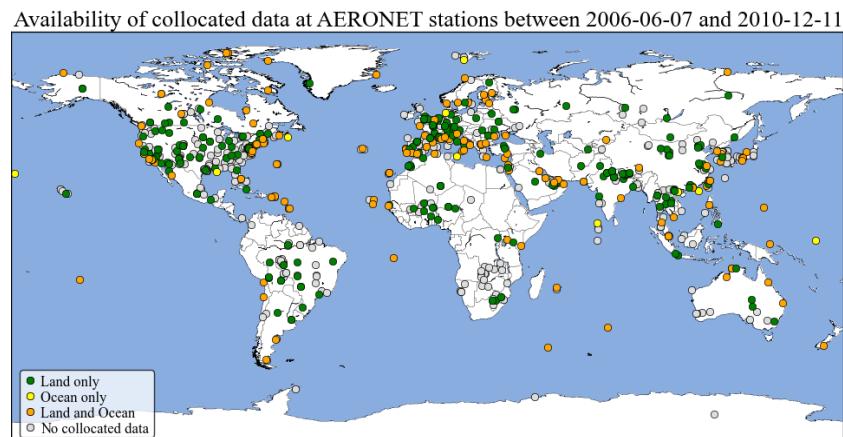
³ Sigma Space Corporation

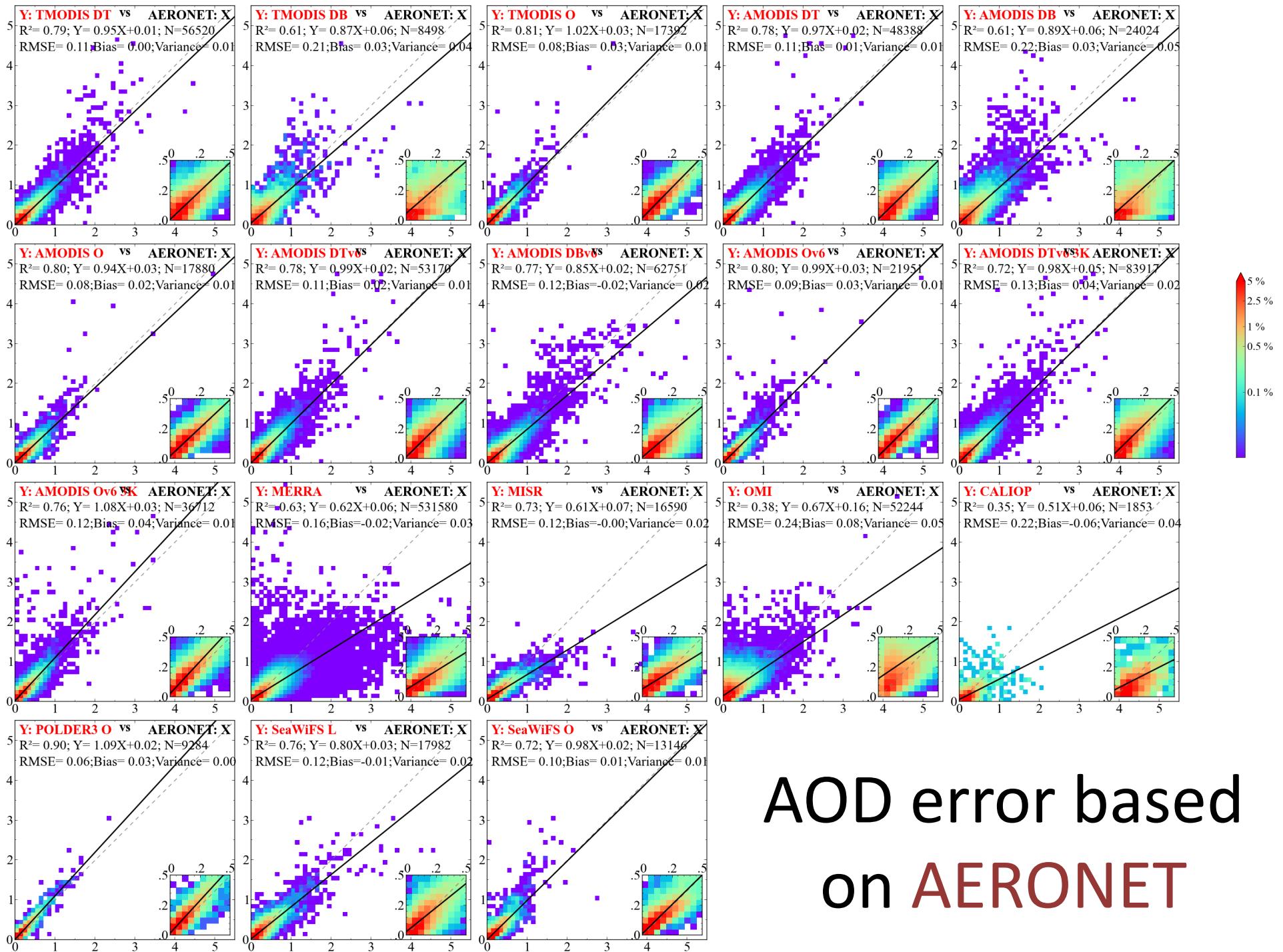
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MAPSS: Multi-sensor Aerosol Products Sampling System

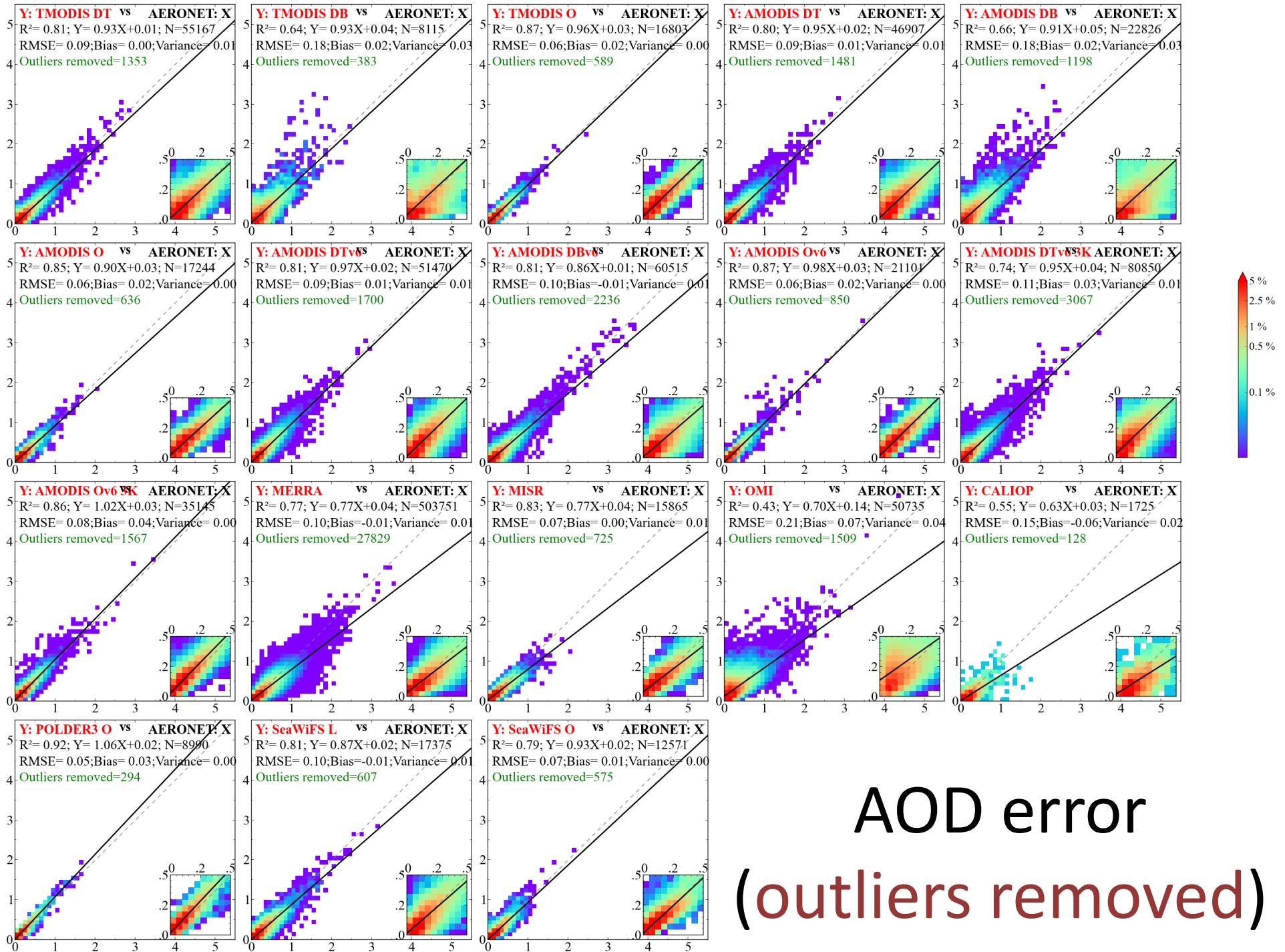


- MAPSS uniformly samples Level-2 aerosol products from multiple sensors over uniform areas of 55km centered around sun photometer **AERONET** ground stations and **MAN** cruise locations
- MAPSS supports Level 2 aerosol data from different spaceborne sensors and a model, including MODIS, MISR, OMI, POLDER, CALIOP, SeaWiFS, VIIRS, MERRAero

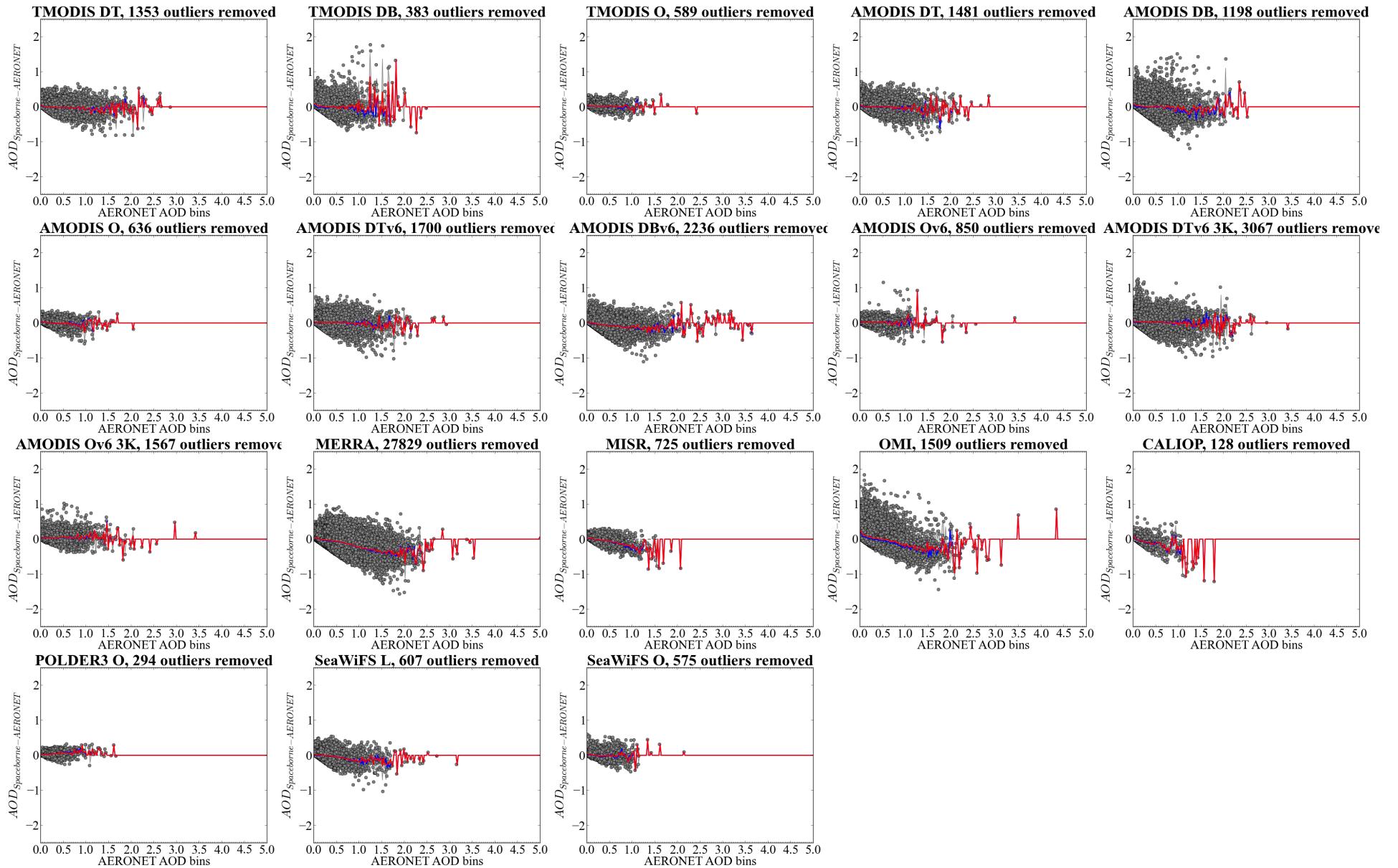


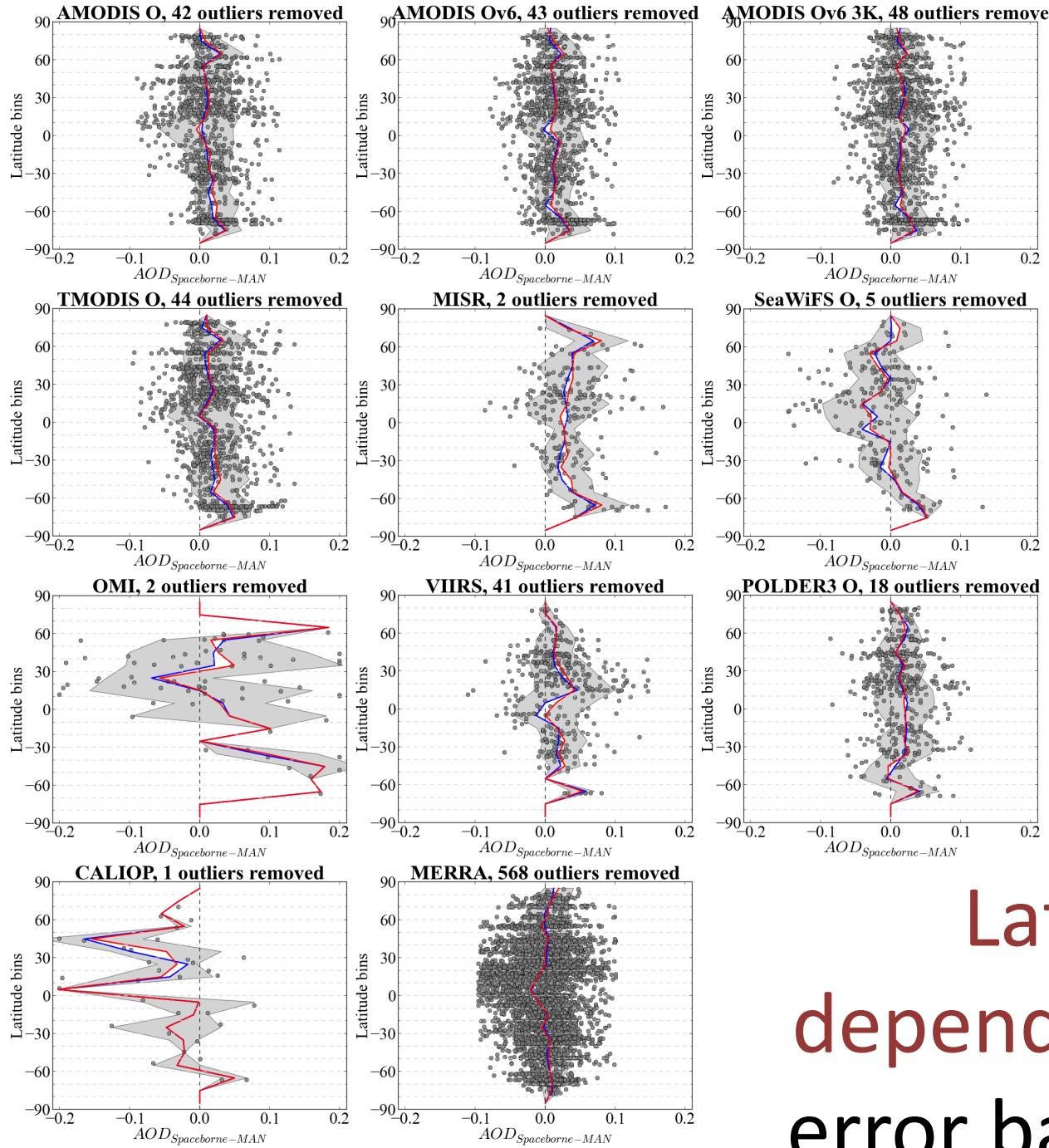


AOD error based
on AERONET

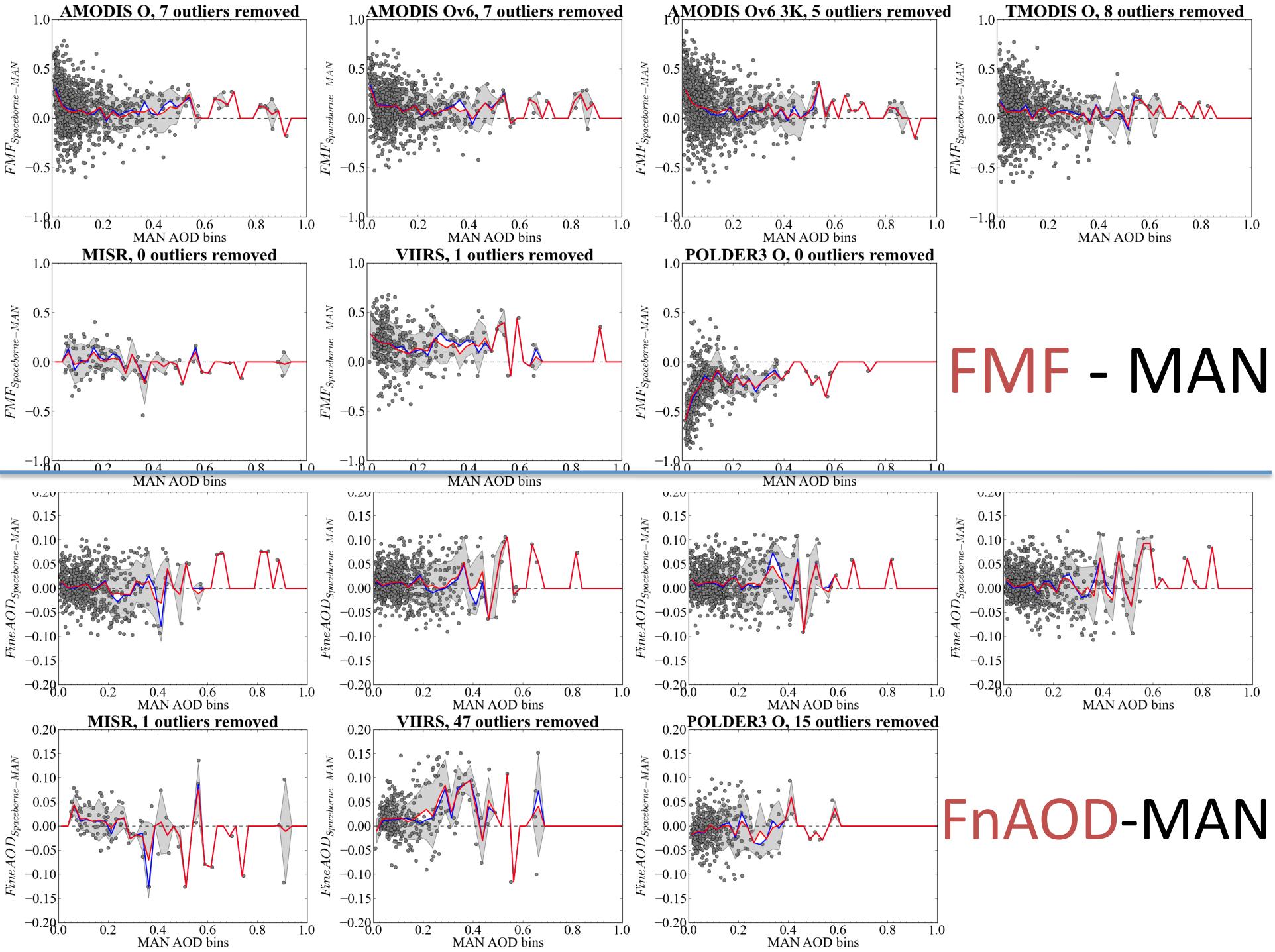


AOD error depending on loading





Latitudinal dependence of AOD error based on MAN



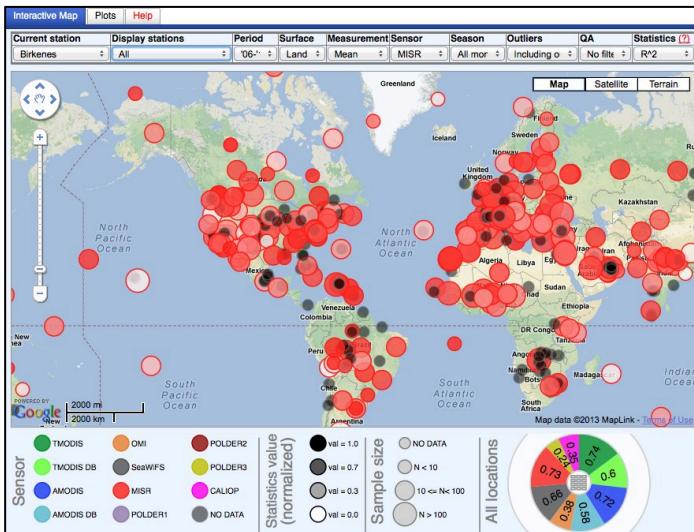
Challenges of the multivariate analysis

- Near impossible to report results at each individual site
- Additional parameters further complicate the analysis
 - Multiple statistics (R², RMSE, Error Envelope, etc.)
 - Multiple seasons
 - Multiple validation strategies (mean vs closest pixel)
 - Different QA filters, outliers, and so on
- Looking at your own data becomes problematic!
- Possible solutions
 - Tables can fit more data than plots, but are harder to read and understand (besides, they can not fit everything either)
 - Digital supplements and archives are a tempting solution, but are they actually read?
 - Interactive tools and data services

Interactive multi-sensor tools

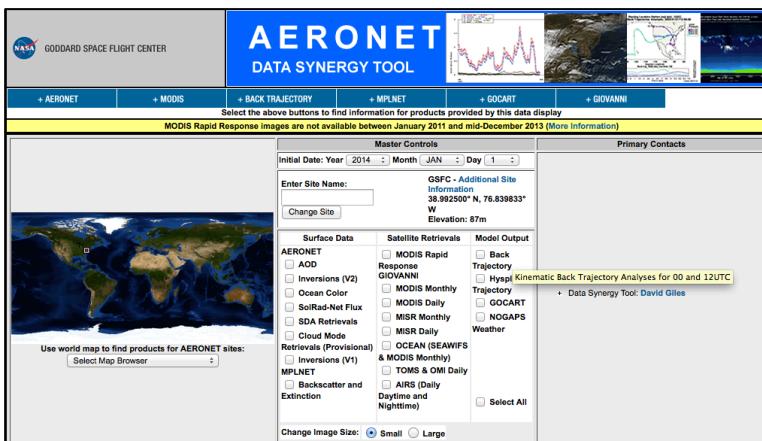
MAPSS data explorer:

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



AERONET data synergy tool:

<http://aeronet.gsfc.nasa.gov/cgi-bin/bamgomas> interactive



MAPSS in Giovanni:

<http://giovanni.gsfc.nasa.gov/mapss/>

MAPSS: Multi-sensor Aerosol Products Sampling System [HELP](#)

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**

To see time series plots of MAPSS data, choose from the criteria below and click **Get Plot(s)**

Select Station

CSFC

Select Parameters

To select parameters, make a single selection from each list below (beginning with the left-most list), and then click **Add!**. Selected parameters will be added to the summary. Repeat for additional parameters.

Basic Advanced

Product <input checked="" type="button" value="Info"/>	Parameter	Layer	Variable
MODIS water vapor L2 (Terra), MODIS water vapor L2 (Terra), OMI aerosols L2, ver. 003 POLDER-1 aerosols over land L2, POLDER-2 aerosols over land L2	Best AOD Best SSA Best absorption AOD Lambert equivalent reflectivity Surface albedo	Best AOD at 354nm Best AOD at 388nm Best AOD at 500nm	Central value Mean Median Standard deviation
No additional information	No additional information	No additional information	Best aerosol optical depth (tau) at 500nm

[More about mean ...](#)

Selected Measurements

MODIS aerosols L2 (Aqua), ver. 051 : Corrected AOD - land : AOD at 550nm - land : Mean	<input type="button" value="Delete"/>
No. of pixels with value: <input checked="" type="radio"/> All <input type="radio"/> >= 5	
Quality over land: <input type="radio"/> All <input checked="" type="radio"/> >= 1 (Marginal or Better) <input type="radio"/> >= 2 (Good or Better) <input checked="" type="radio"/> = 3 (Very Good)	
OMI aerosols L2, ver. 003 : Best AOD : Best AOD at 500nm : Mean	<input type="button" value="Delete"/>
No. of pixels with value: <input checked="" type="radio"/> All <input type="radio"/> >= 2	
Final algorithm flag: <input type="radio"/> All <input checked="" type="radio"/> =0 (Most reliable) <input type="radio"/> <=2 (Less reliable)	

Select Date Range

Enter date(s) as YYYY-MM-DD or use calendars.

Date Range:

To see time series plots of MAPSS data, choose from the criteria above and click **Get Plot(s)**

ACKNOWLEDGMENT: Support for the development of this data access system for integrated validation, intercomparison, and analysis of aerosol products from multiple satellites has been provided by NASA HQ (PM: Stephen Berkoff) through the [ROSES 2006 ACCESS Program](#) (PI: Charles Ichoku). The [AERONET](#) data are contributed by the International AERONET Federation (PI: Brent Holben).

Benefits of multi-sensor systems for end users of the data

- Dramatically cut learning curve necessary to access multiple data products, including proprietary data formats, proper use of QA flags, usage recommendation, and so on
- Enable quick and efficient what-if analysis
- Reduce overall analysis time

Pitfalls

- Greater potential for abusing the data
- Analysis types are limited to those implemented in the system
 - Need to provide a unified L2(G) data for multiple sensors