OMI aerosol products and validation

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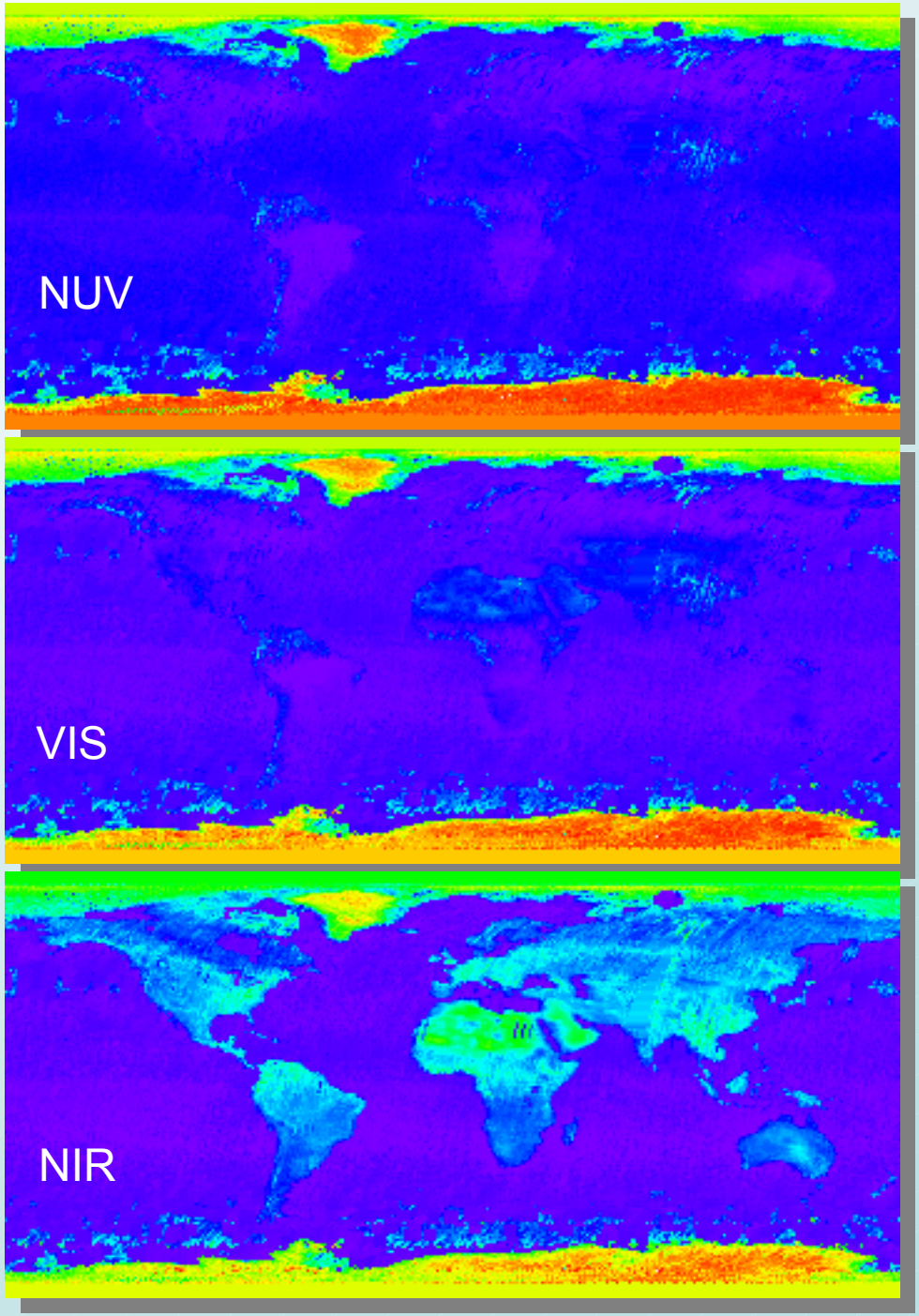
OMI aerosol products

	Near-UV method	**Multi-wavelength method**
Maintainer:	Omar Torres (GSFC)	Pepijn Veefkind (KNMI)
Heritage:	TOMS	none (new)
Status:	Provisionally released	Ready for provisional release
λ's employed:	342.5 and 388 nm	~8 λ's between 340 and 500 nm
Main retrievals:	Absorption optical thickness, UV aerosol absorbing index	Extinction optical thickness, Aerosol type
Principle:	1) Determine *aerosol index*	1) Fit spectrum to find AOT for ~50 aerosol models
	2) Determine aerosol type from aerosol index and aerosol climatology	2) Choose best aerosol model based on RMS error (χ^2)
	3) Determine AOT and SSA from lookup tables for the aerosol type	3) Spread in AOTs for different models gives indication for accuracy

Advantages of Near-UV

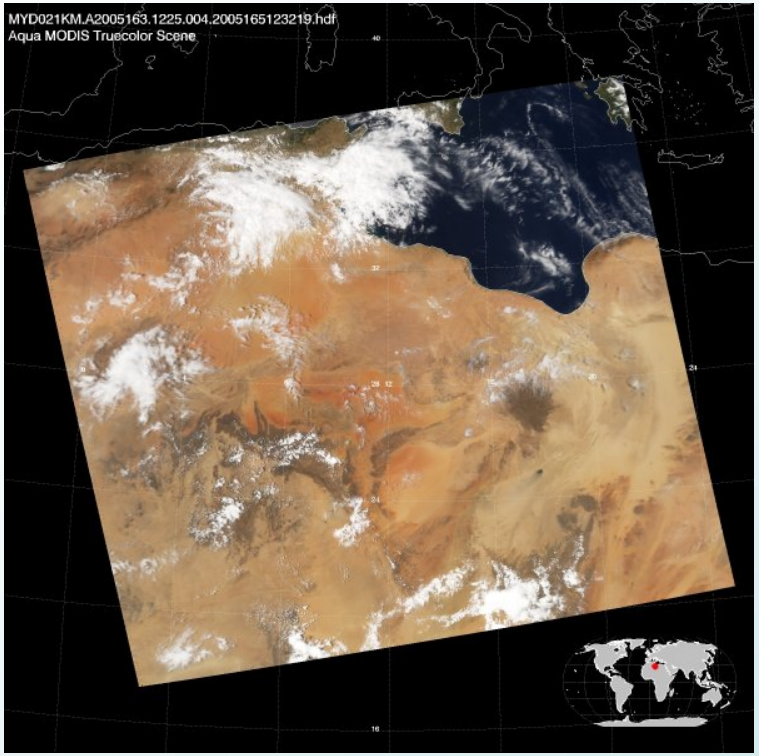
- Aerosol types can be distinguished from surface spectral absorption characteristics
- Low surface albedo over land

Source: GOME-1

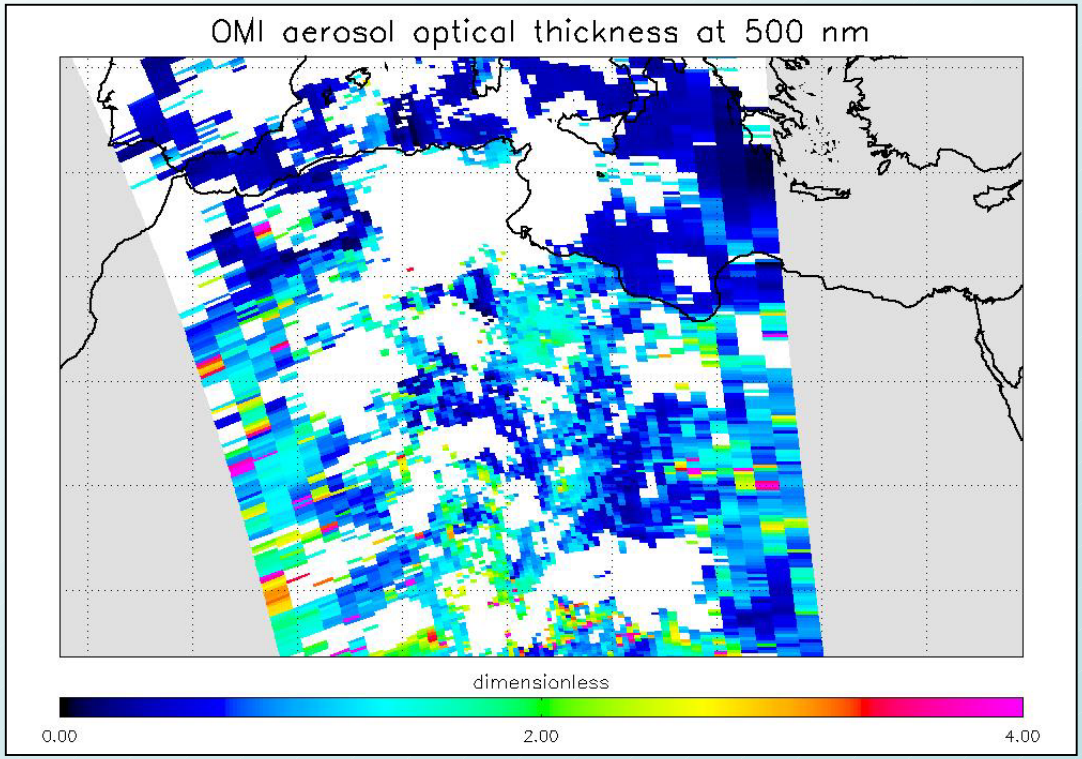


Multi-wavelength aerosol product example

Case study: Sahara, 12 June 2006



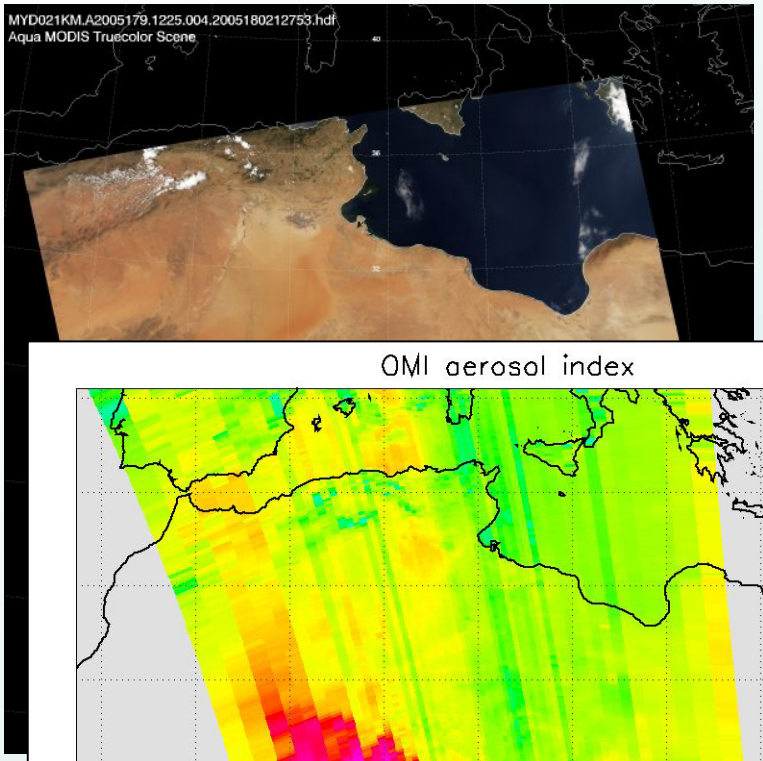
MODIS image

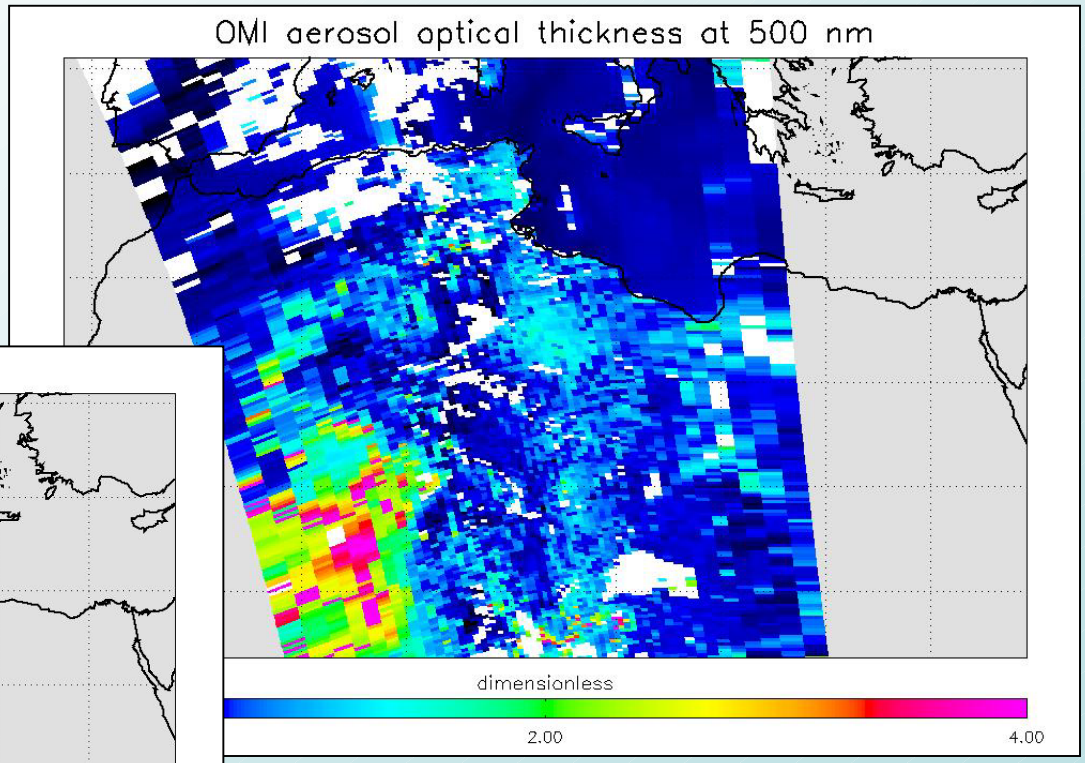


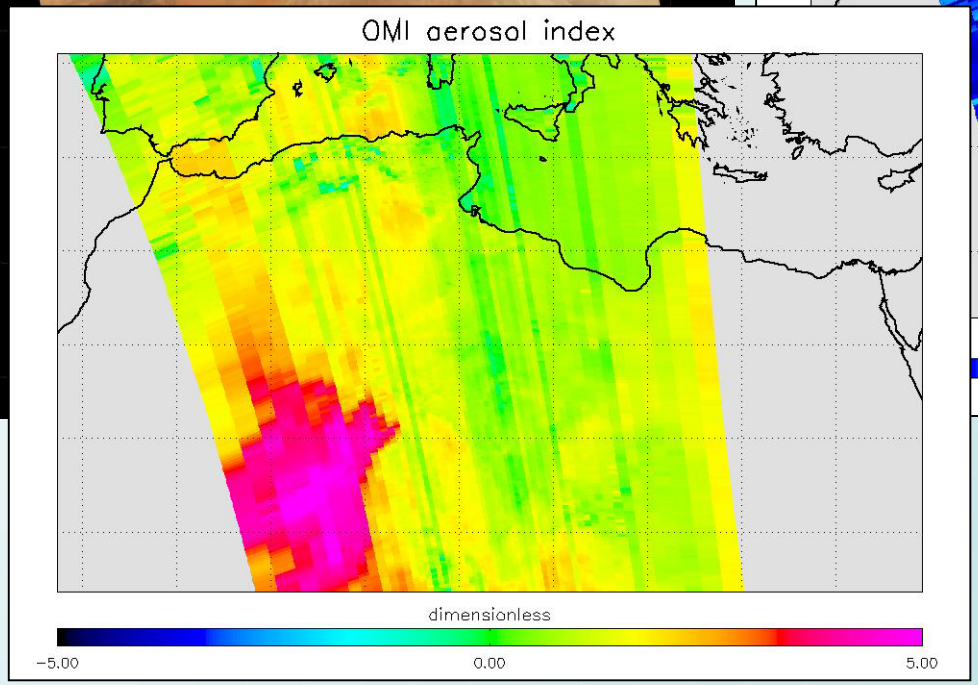
OMI multi-wavelength AOT

Multi-wavelength aerosol product example

Case study: Sahara, 28 June 2006





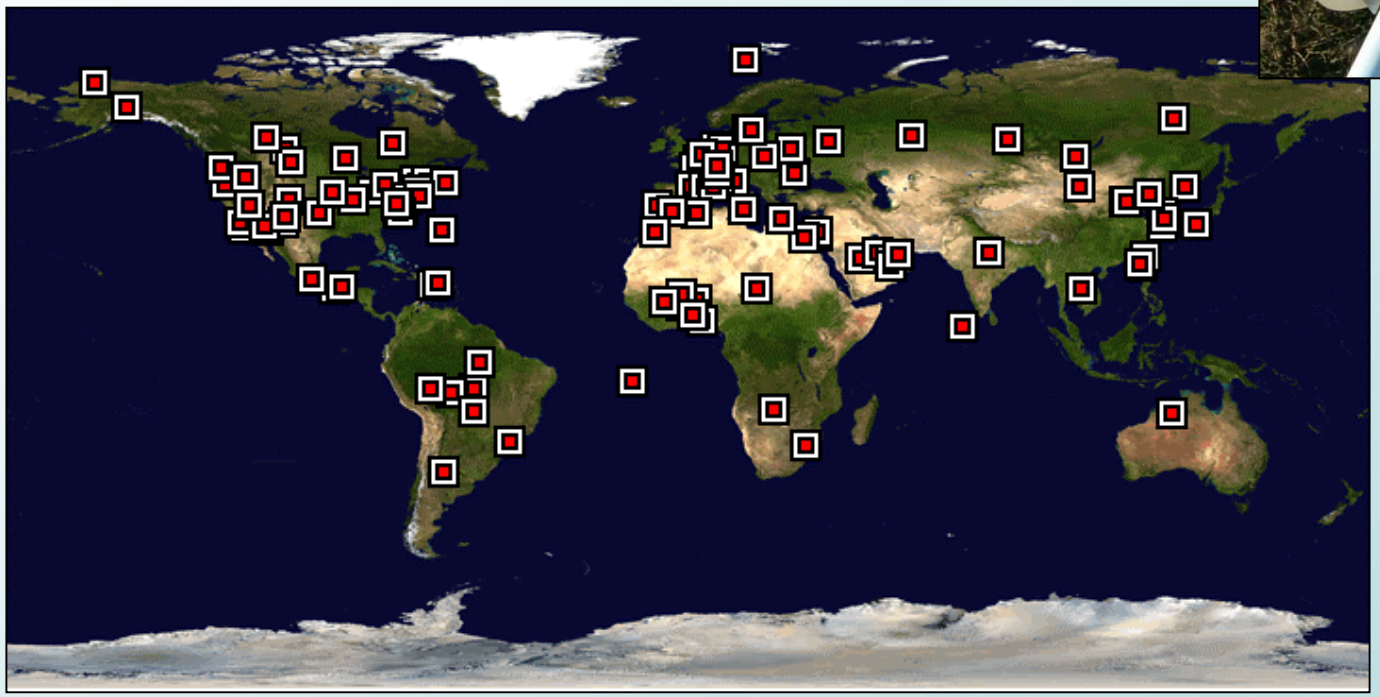


OMI multi-wavelength AOT

OMI multi-wavelength AI

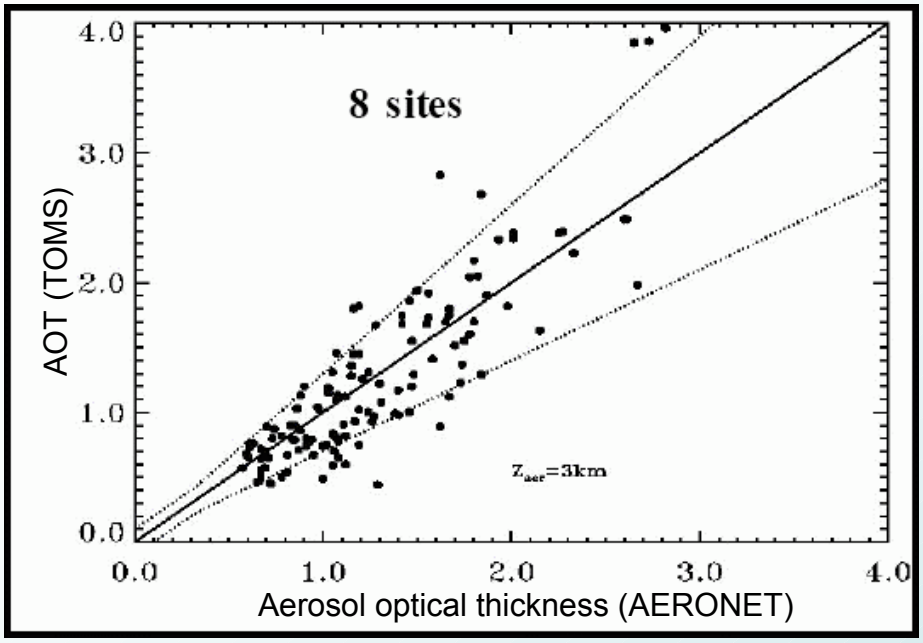
Validation: AERONET

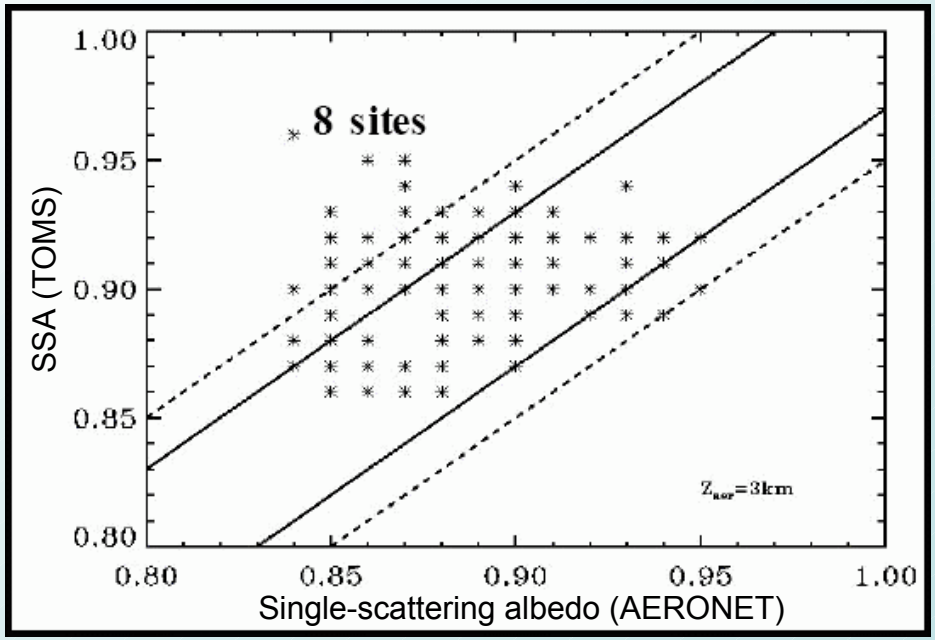
- Aerosol Robotic Network
- Sun photometers (CIMEL CE-318)
- Measure the AOT every 15 minutes (λ = 340 - 1020 nm)
- ~120 ground stations currently active



CIMEL λ = 340, 380, 412, 440, 443, 490, 500, 532, 551, 555, 667, 675, 870, 1020, 1640 nm

Near-UV product validation example: TOMS data





82% of points are within expected accuracy limits (0.1 or 30%)

63% within +/- 0.03
87% within +/- 0.05

From Torres et al. JGR 110 (2005)

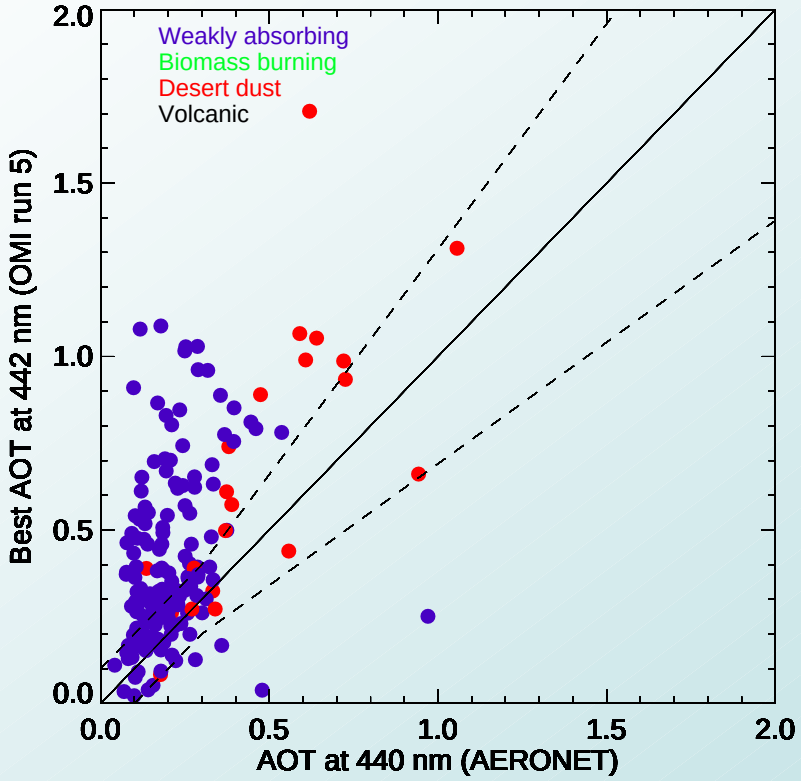
- Performance for OMI may be expected to be similar or better.

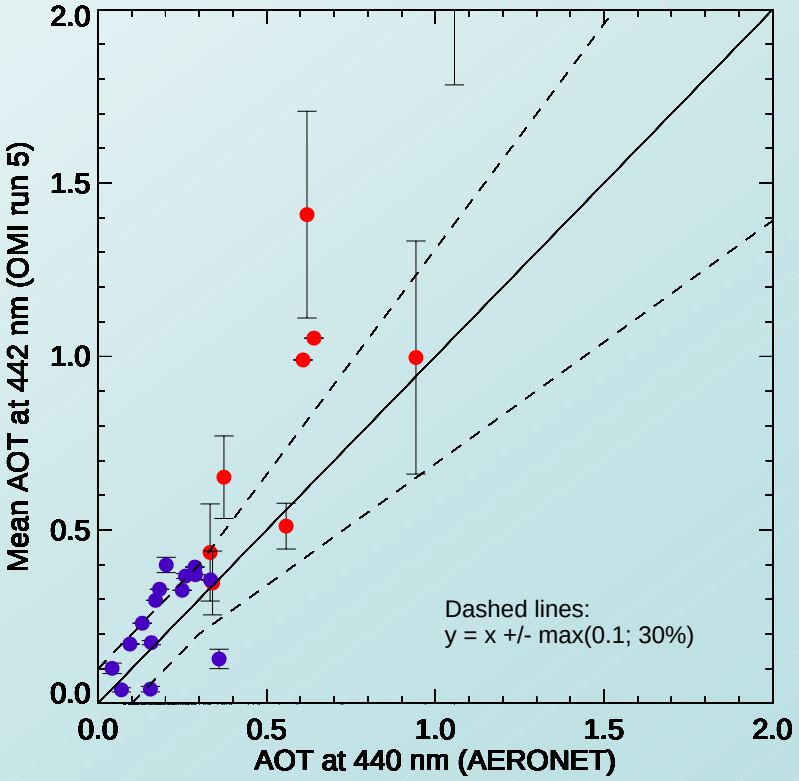
Multi-wavelength product validation with AERONET

MW aerosol extinction optical thickness over European and African stations, May-July 2005

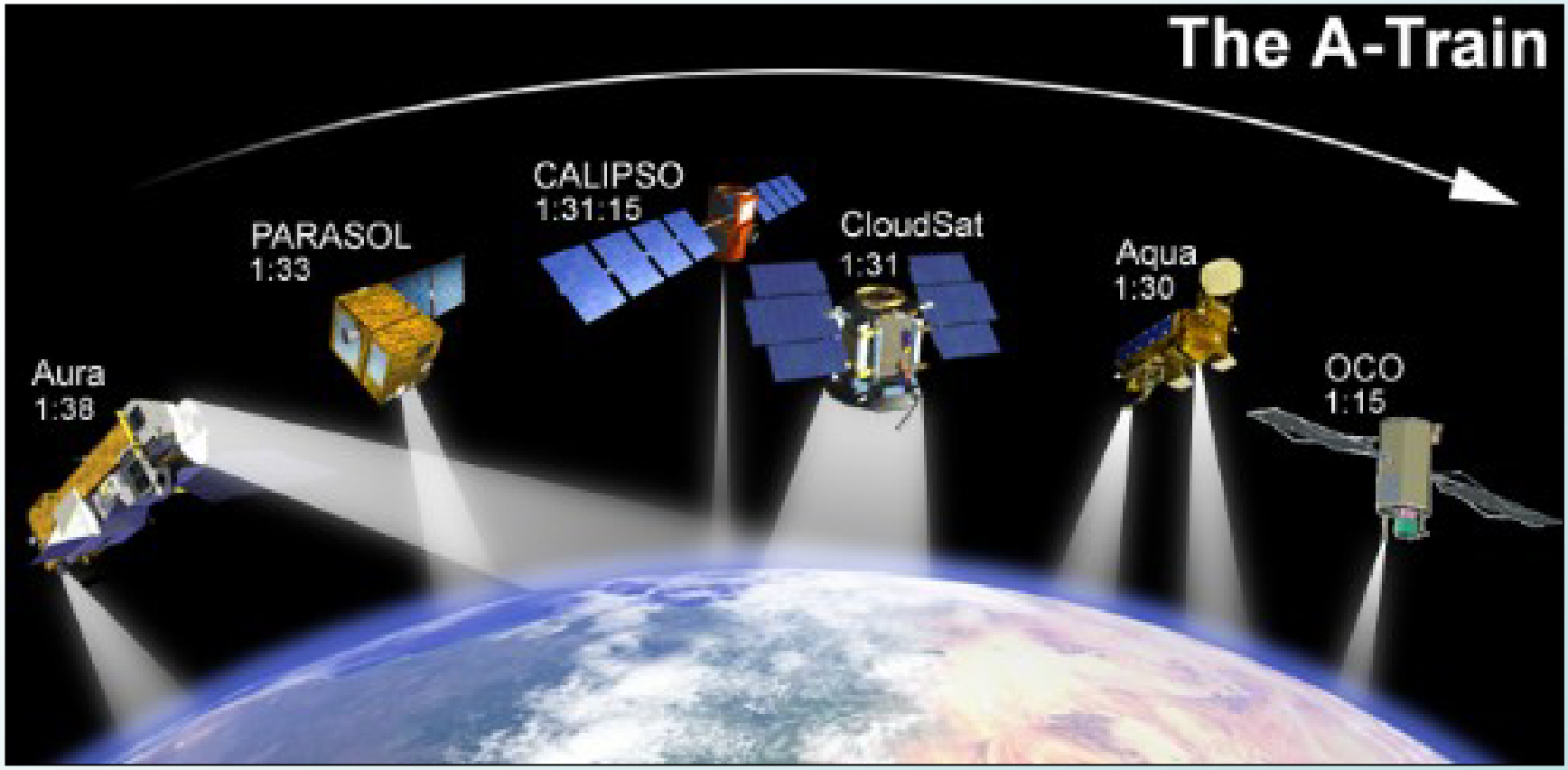
Left: best-fitting aerosol model

Right: average of all aerosol models with χ^2 < threshold.





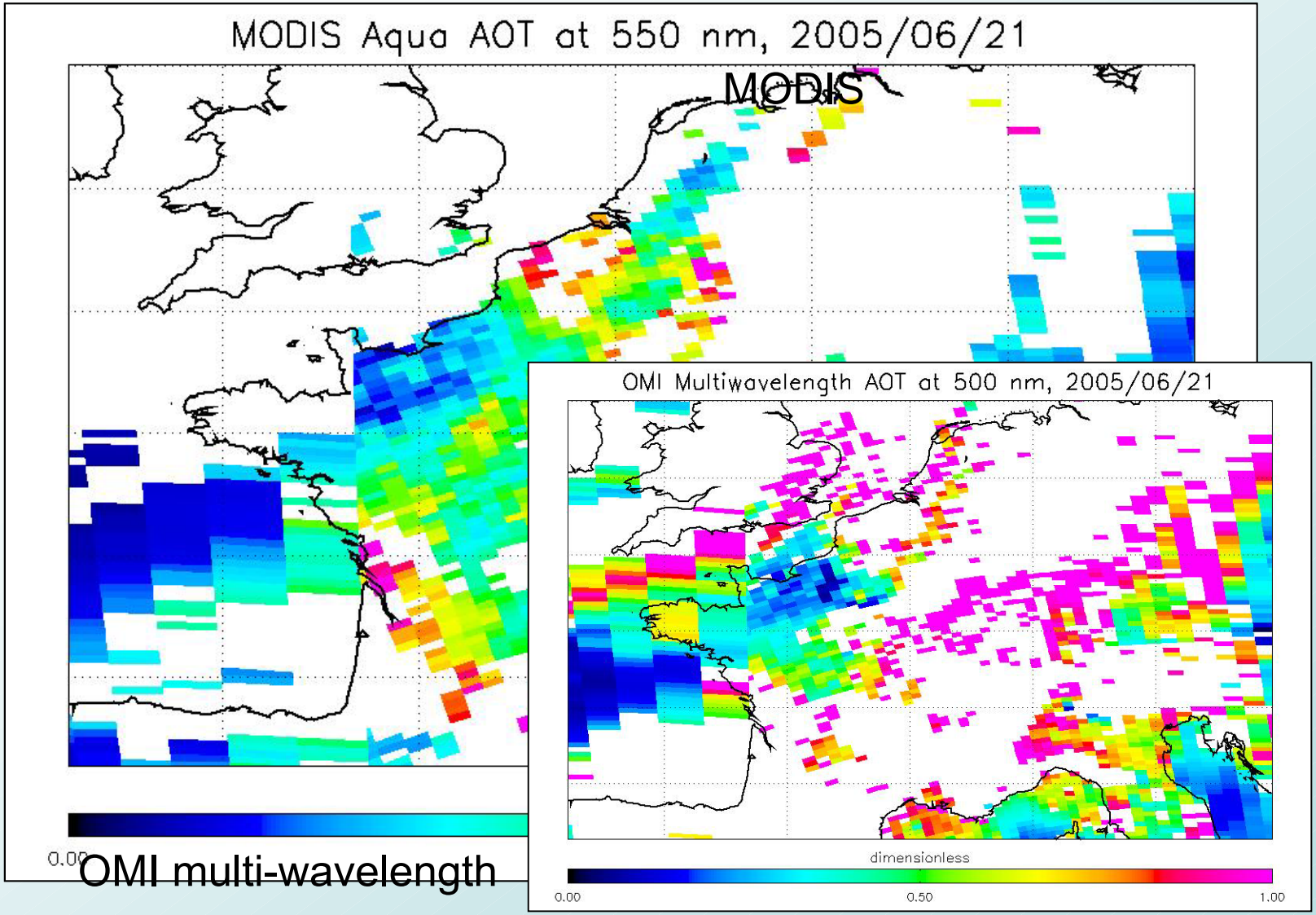
A-Train opportunities



Other instruments on the A-Train that observe aerosols:

- on EOS-Aqua: MODIS and AIRS
- on PARASOL: POLDER
- on CALIPSO: CALIOP

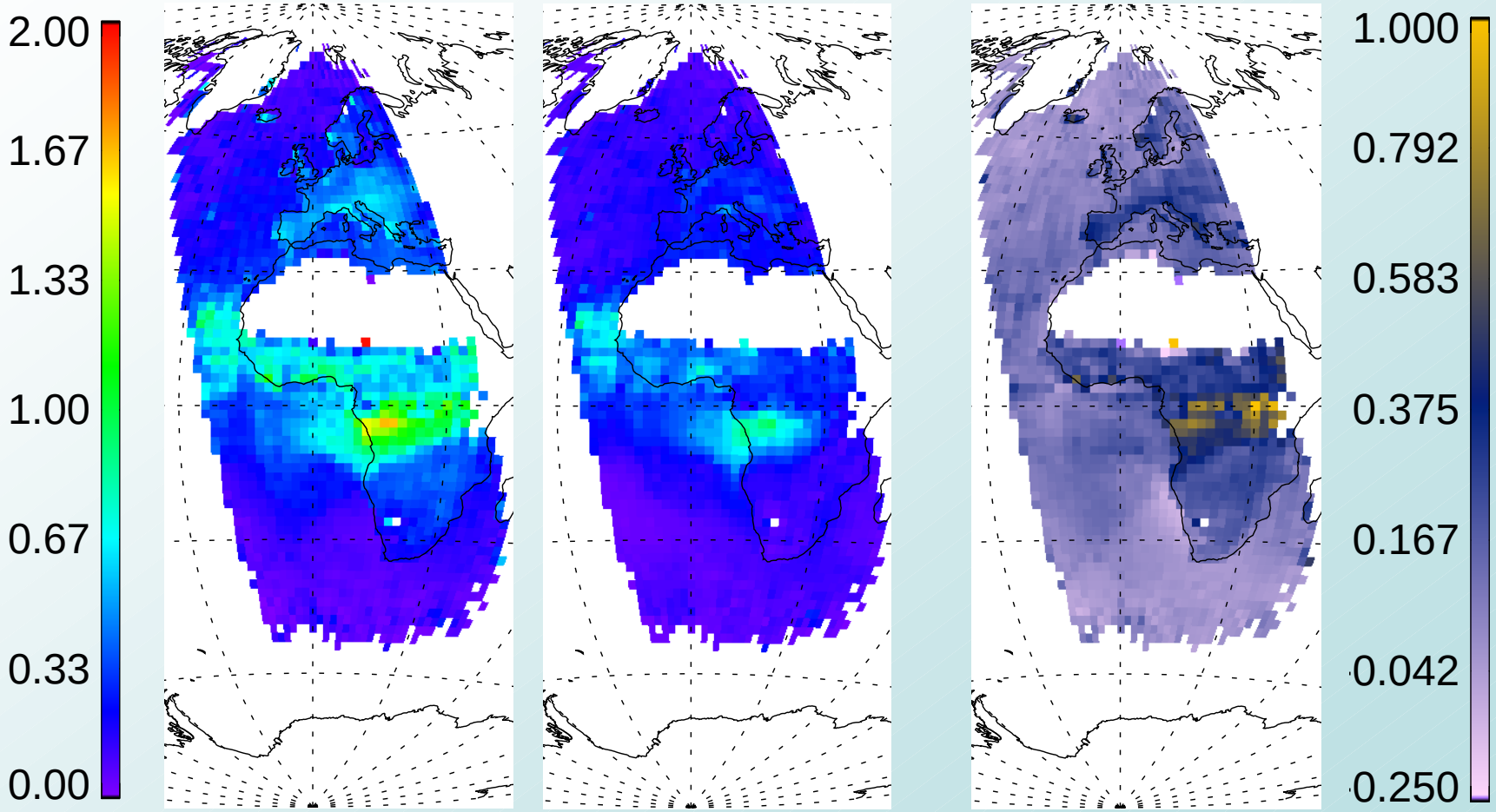
Comparison between OMI (MW) and MODIS



Results of comparison with MODIS

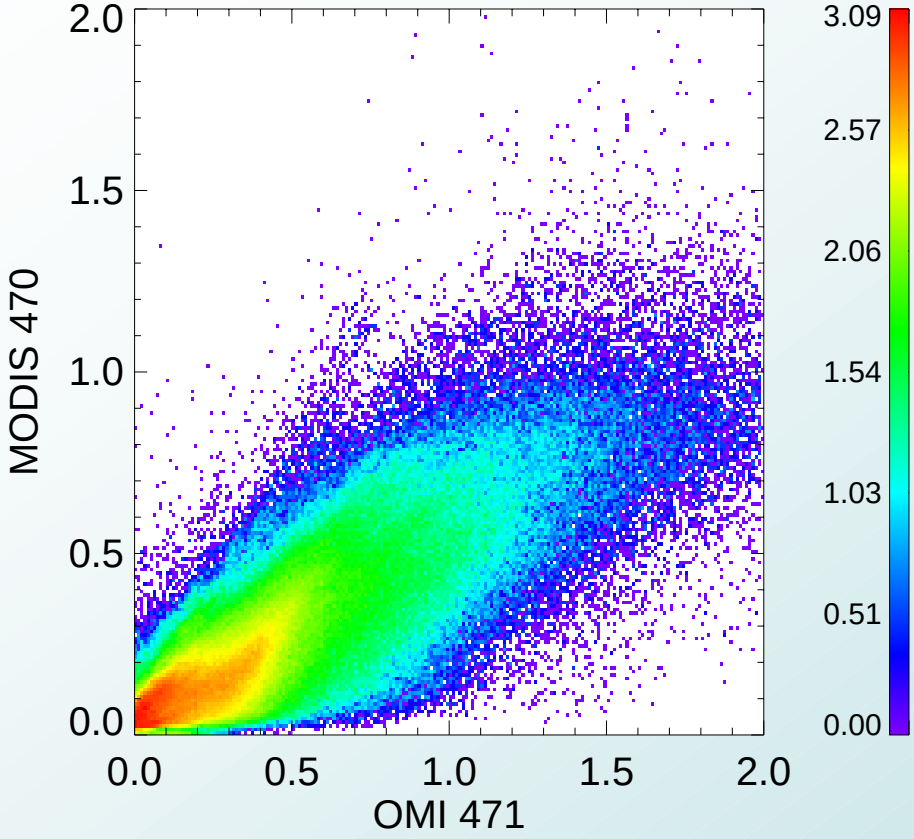
Averages over May-July 2006

MODIS collection 4



OMI AOT at 471 nm MODIS AOT at 470 nm OMI - MODIS

Results of Comparison

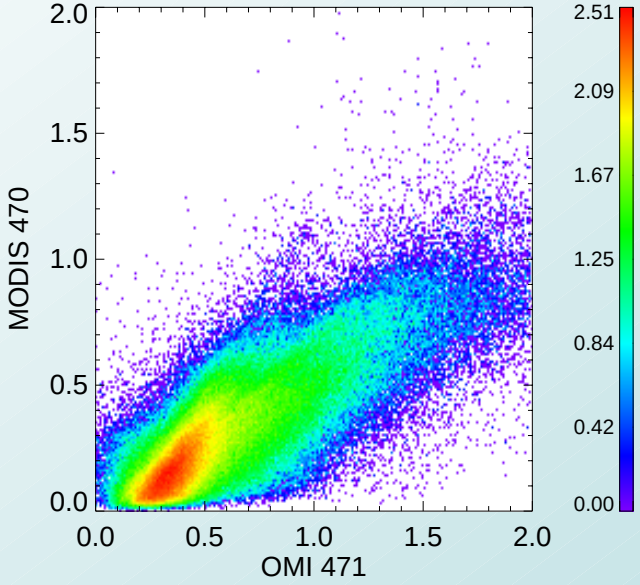


r = 0.833, α = 0.477, β = 0.053, N ~ 620,000

r correlation, α slope, β intercept, N # obs

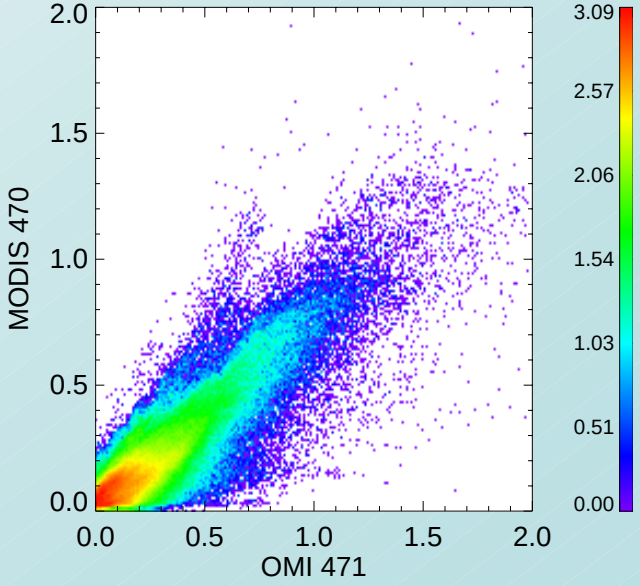
Land only

r = 0.814, α = 0.466, β = 0.033, N ~ 260,000



Ocean only

r = 0.862, α = 0.650, β = 0.032, N ~ 350,000



Conclusions

- Use of near-UV holds unique information on aerosols.
- Comparisons for small subset are promising, both with AERONET and with MODIS.
- Tools are in place for more thorough validation and verification studies.
- Near-UV product will become available publicly this fall this year.
- Multi-wavelength product follows shortly afterwards.