

# Getting Over the Finish Line:

Final 7 months of Unified Aerosol  
Algorithm development:  
2024 October to 2025 April

*A global, automatic, aerosol  
characterization from OCI inputs*



The Unified Algorithm Team (minus Vinay Kayetha)

Lorraine Remer, Omar Torres, Robert C. Levy, N. Christina Hsu,  
Shana Mattoo, Hiren Jethva, Yingxi Rona Shi, Woogyung Vincent Kim

The UAA team was not selected for funding for PACESAT-3.

Status at end of PACESAT-2 under Year 4 No Cost Extension...

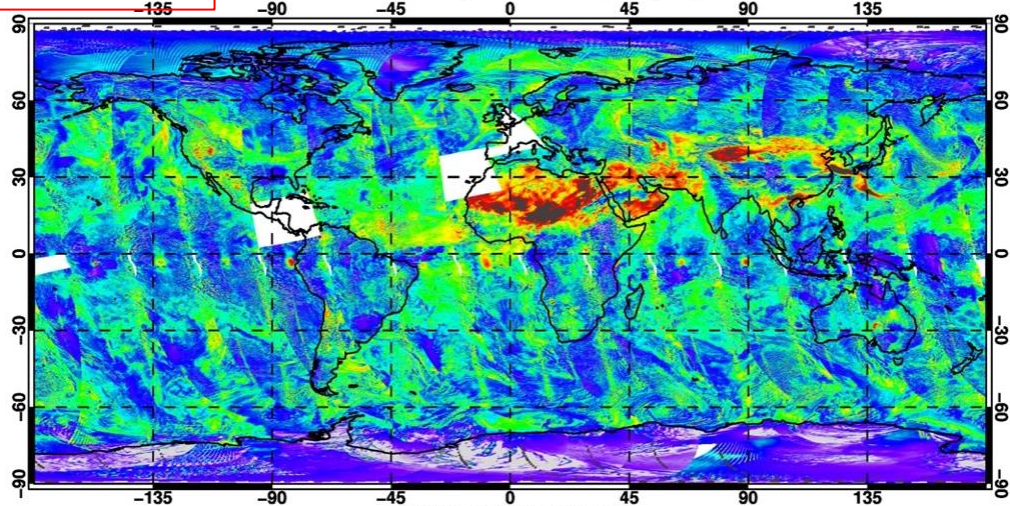
- ✓ Algorithm had been at SDS for over a year
- ✓ Modifications made to standardize the code to SDS system
- ✓ PACE launch
- ✓ First Light images produced
- ✓ Algorithm run in test batches with on-orbit OCI inputs
  - Issue identified with OCI's v2 calibration in UV bands
  - Code not yet running operationally
  - Not enough data run for either sanity checking or validation
  - Code messy
  - Insufficient documentation

The UAA team was provided with augmented funding that would take the algorithm over the finish line

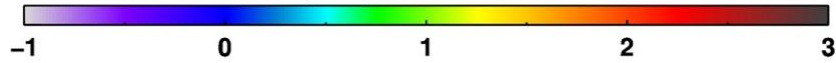
- Augmented funding ends at the end of April 2025

OCI V1

PACE-OCI, 17 Mar 2024 (V1)

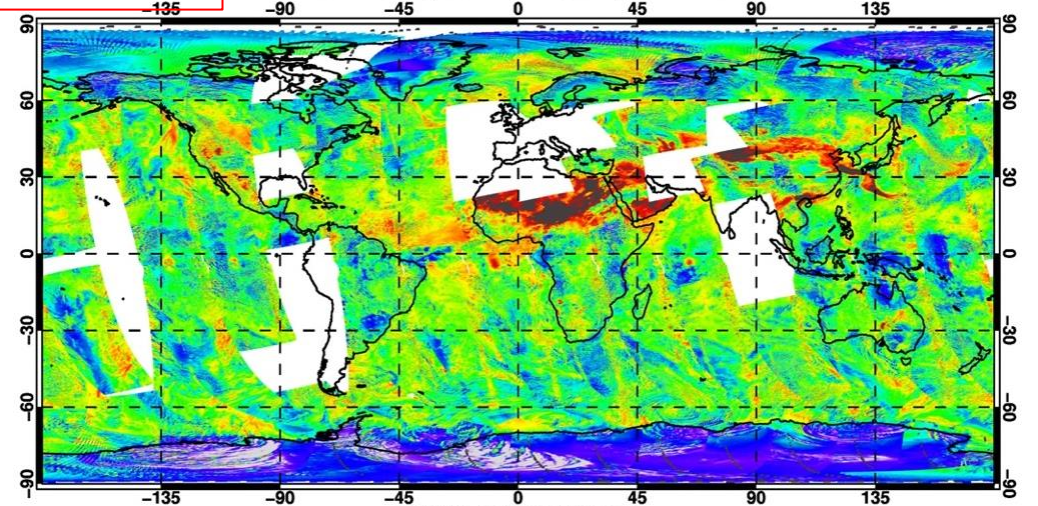


(NUV) Aerosol Index

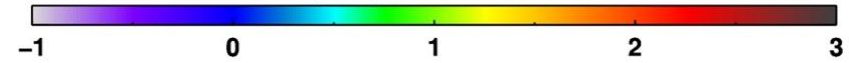


OCI V2

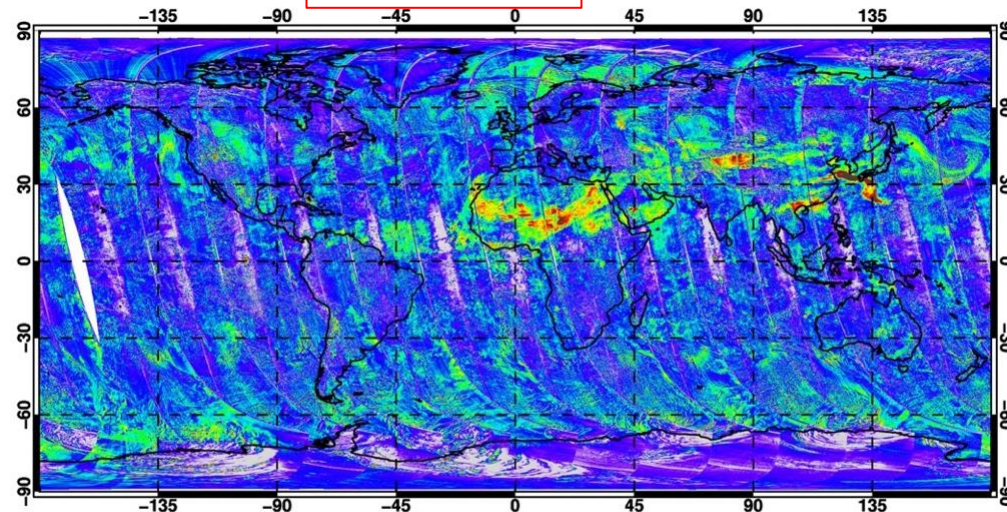
PACE-OCI, 17 Mar 2024 (Ver2 L1B)



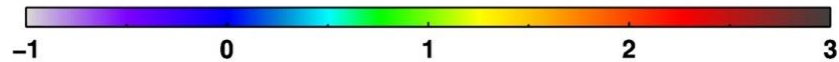
(NUV) Aerosol Index



TropOMI



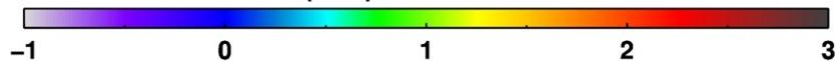
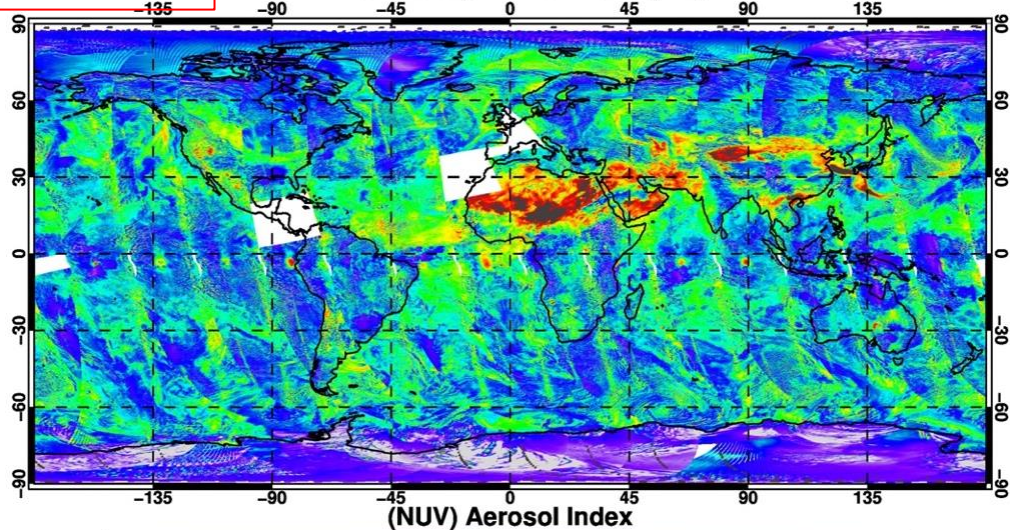
NUV Aerosol Index



UV Aerosol Index  
Defined by the  
spectral signature  
of two UV  
wavelengths

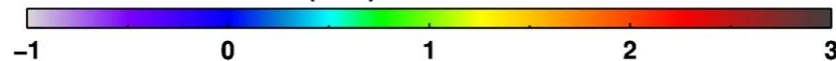
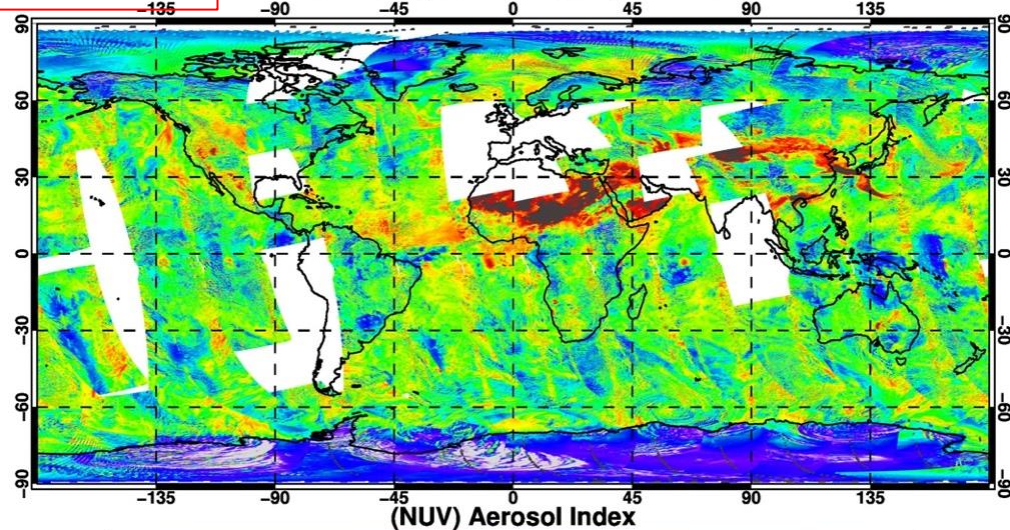
OCI V1

PACE-OCI, 17 Mar 2024 (V1)



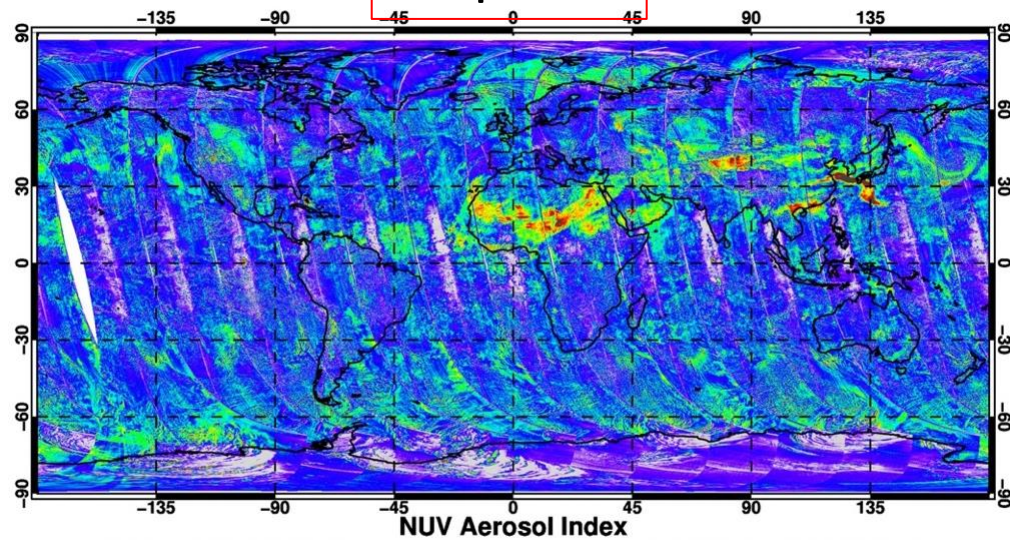
OCI V2

PACE-OCI, 17 Mar 2024 (Ver2 L1B)



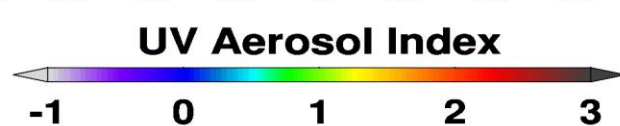
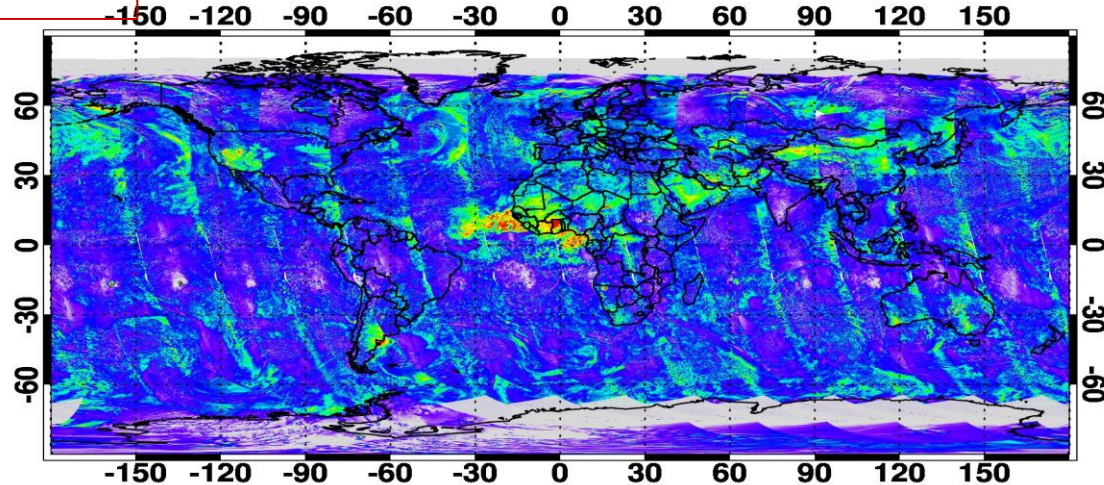
TropOMI

2024-03-17



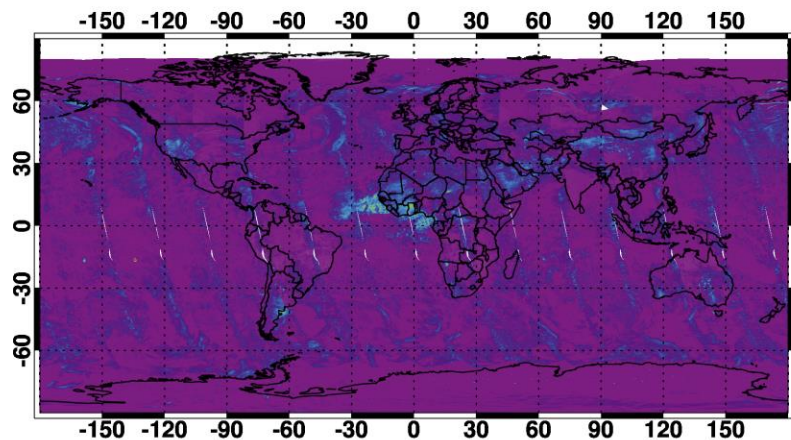
OCI V3

2025-02-10



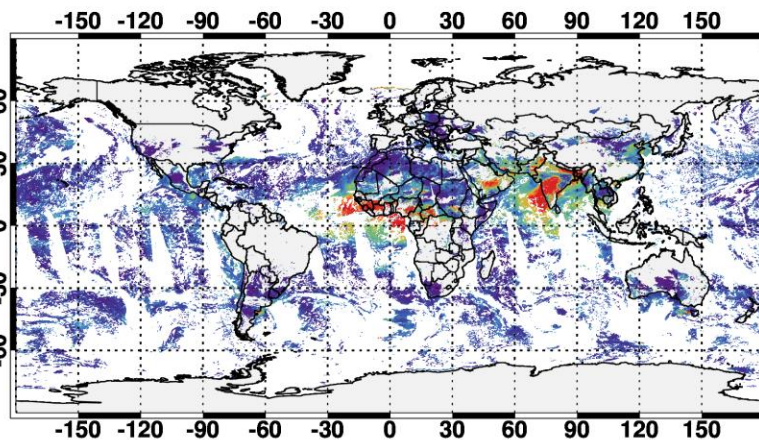
# Results from forward processing

## PACE-OCI UAA Retrievals 2025:02:10



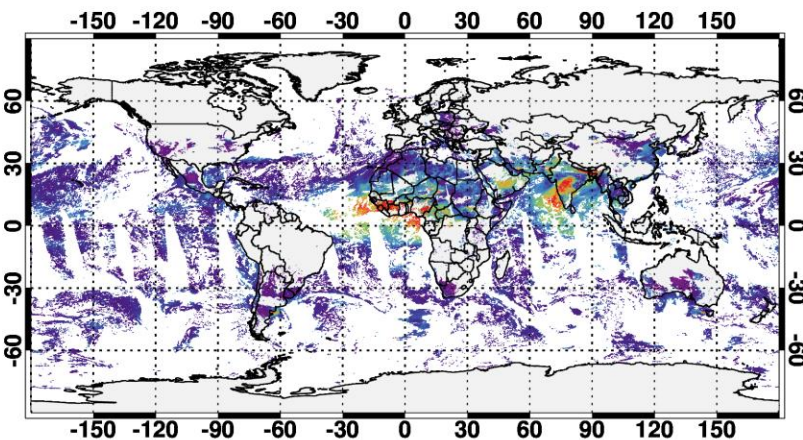
UV Aerosol Index

0 1 2 3 4 5



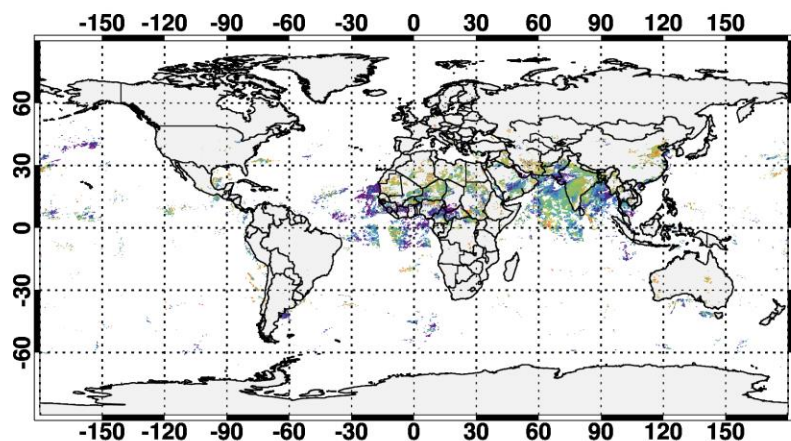
AOD (clear+above-cloud) [388 nm]

0.00 0.25 0.50 0.75 1.00



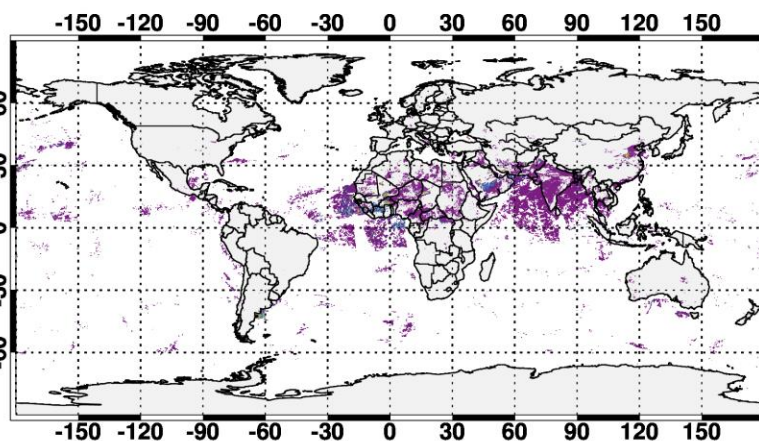
AOD (clear-sky) [550 nm]

0.00 0.25 0.50 0.75 1.00



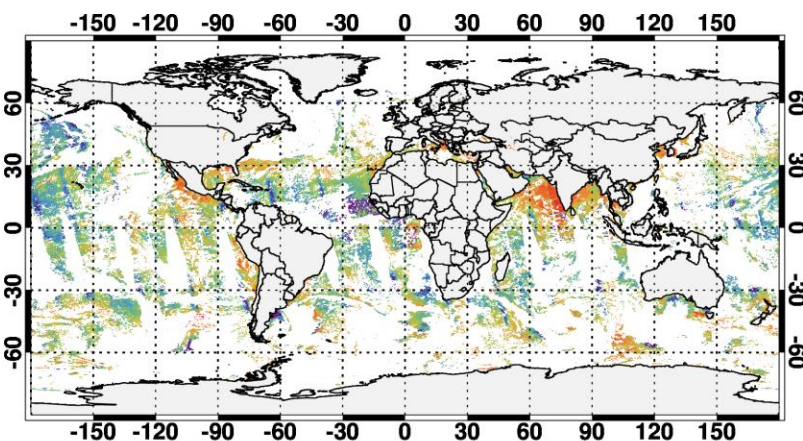
SSA [388 nm]

0.84 0.88 0.92 0.96 1.00



Aerosol Layer Height [km]

0.0 1.0 2.0 3.0 4.0 5.0

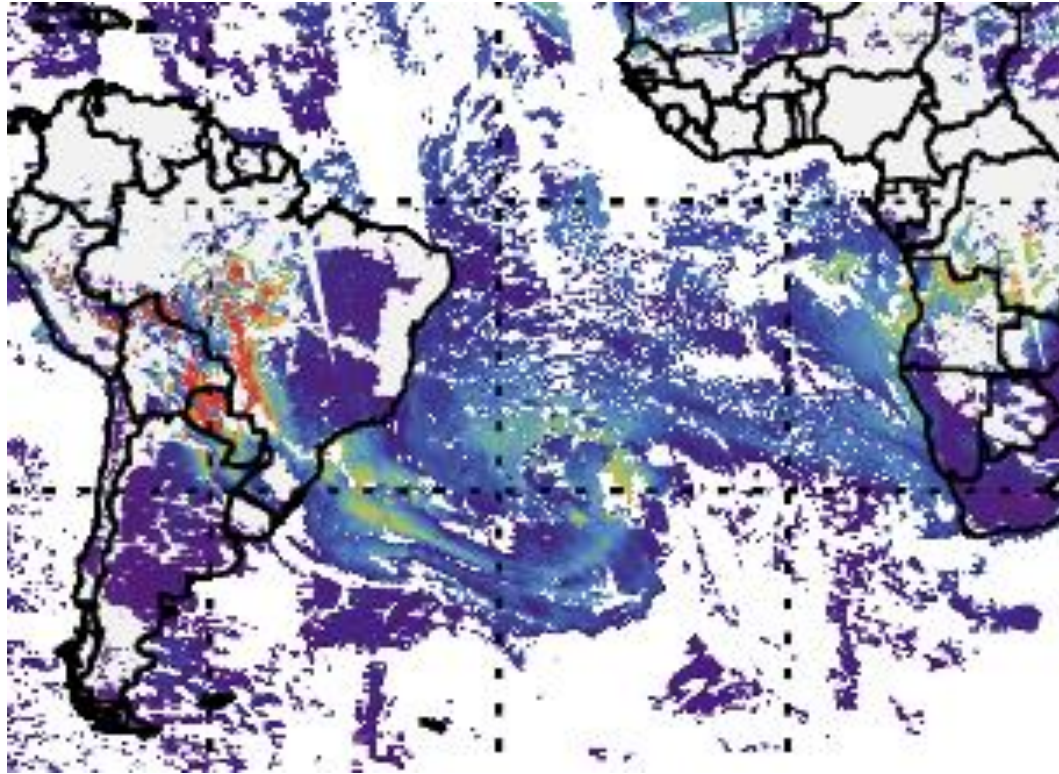


Fine Mode Fraction

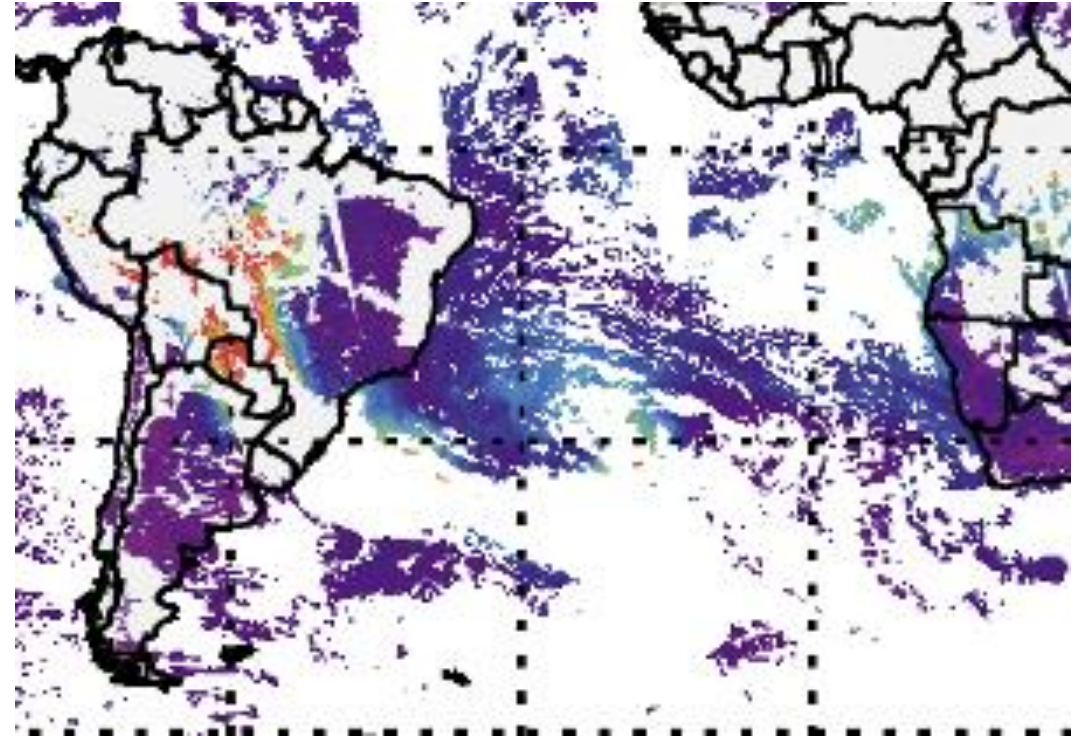
0.00 0.25 0.50 0.75 1.00

2024-09-12

All sky AOD 388 nm

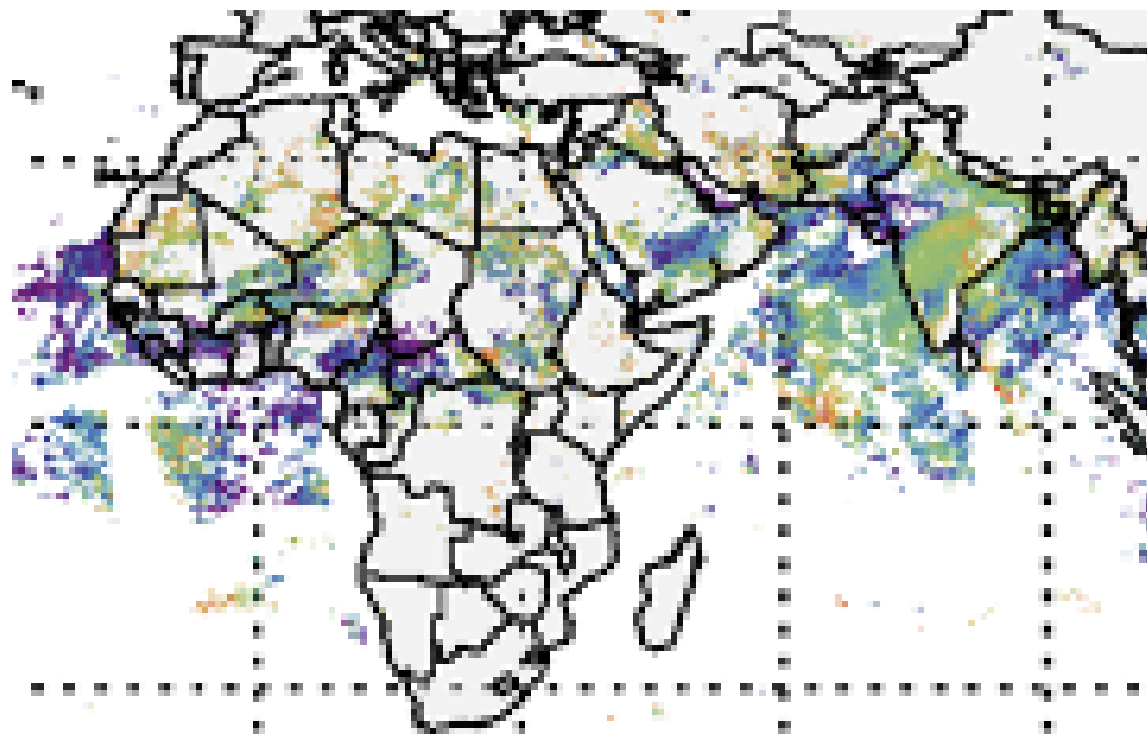


Clear sky AOD 550 nm

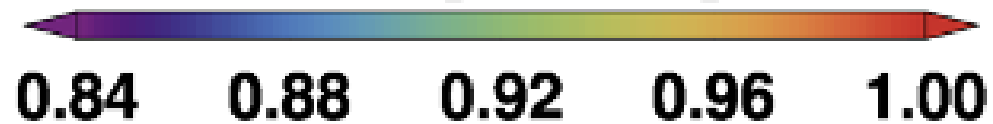


2025-02-10

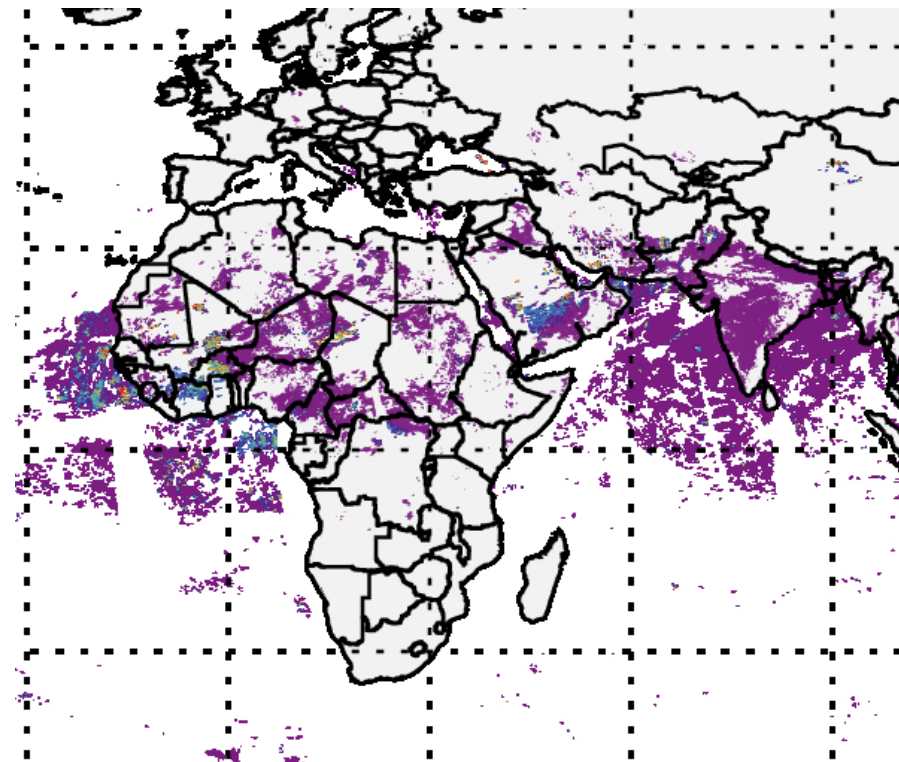
SSA 388 nm



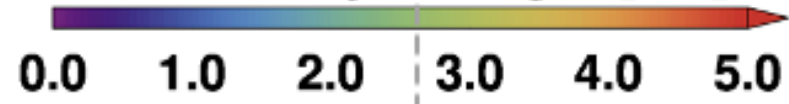
**SSA [388 nm]**



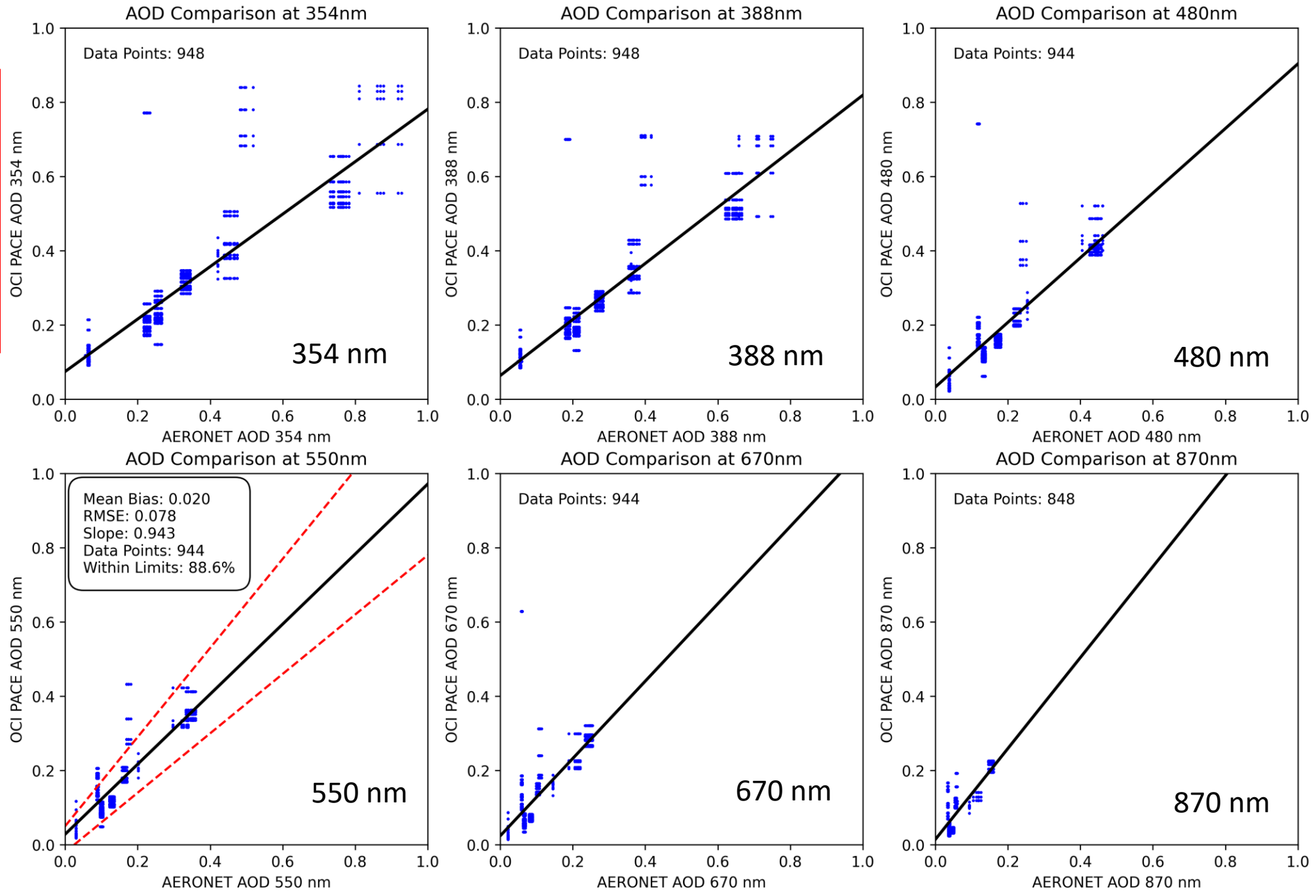
ALH (km)



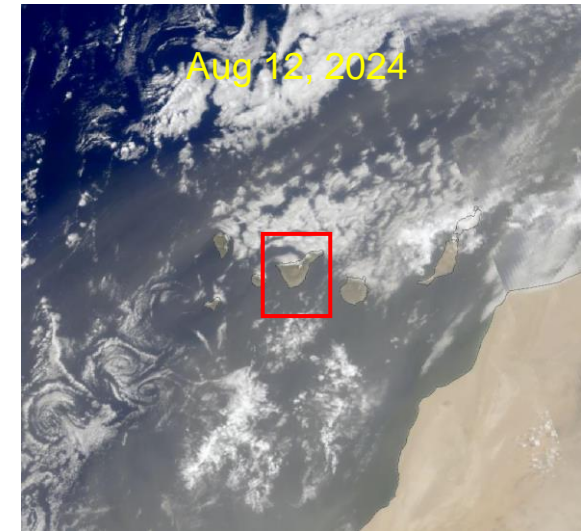
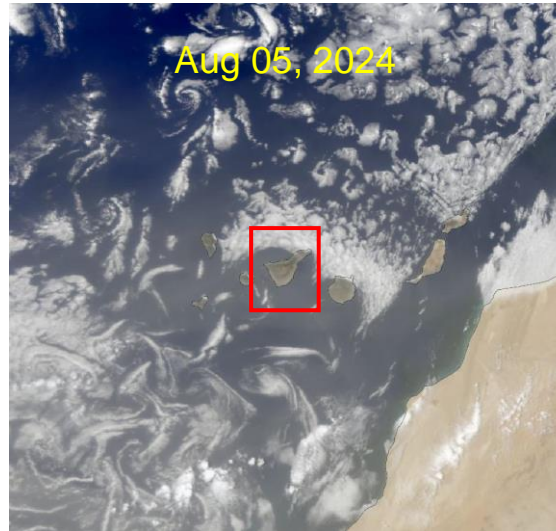
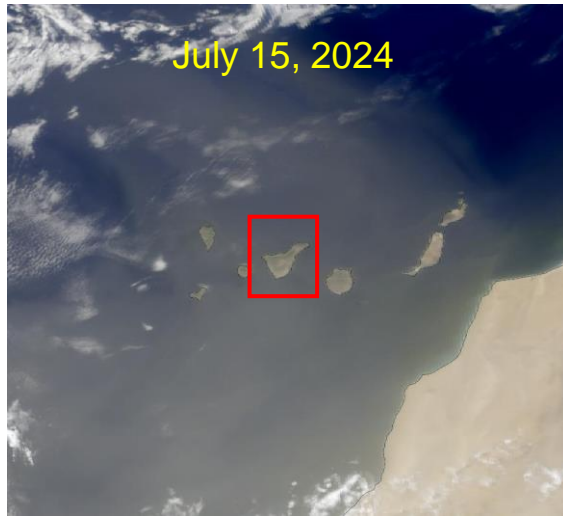
**Aerosol Layer Height [km]**



**AOD  
validation  
against  
AERONET**



# UV-VIS MFRSR Dataset for Validation of PACE-OCI 388-nm Aerosol Absorption Product



## Limited comparison PACE-OCI vs. MFRSR 388-nm SSA

Date	MFRSR 388-nm SSA Interpolated [340,380,440]	PACE-OCI 388-nm SSA
July 15	0.866	0.869 (1 meas.)
Aug 05	0.904	0.890 (3 meas.)
Aug 12	0.905	0.880 (6 meas.)

**PACE-OCI SSA388 agrees with MFRSR inversion within  $\pm 0.02$**

**July and August processing of PACE-OCI data with UAA is requested**

**Two more MFRSR sensor deployments are planned:**  
**1) Yonsei University, Seoul, South Korea**  
**2) Bozeman, Montana, USA**