



CEOS AC-VC-19 / ACSG Joint Meeting 2023

Aerosol layer height retrieval from EPIC and TROPOMI Oxygen B-band observations

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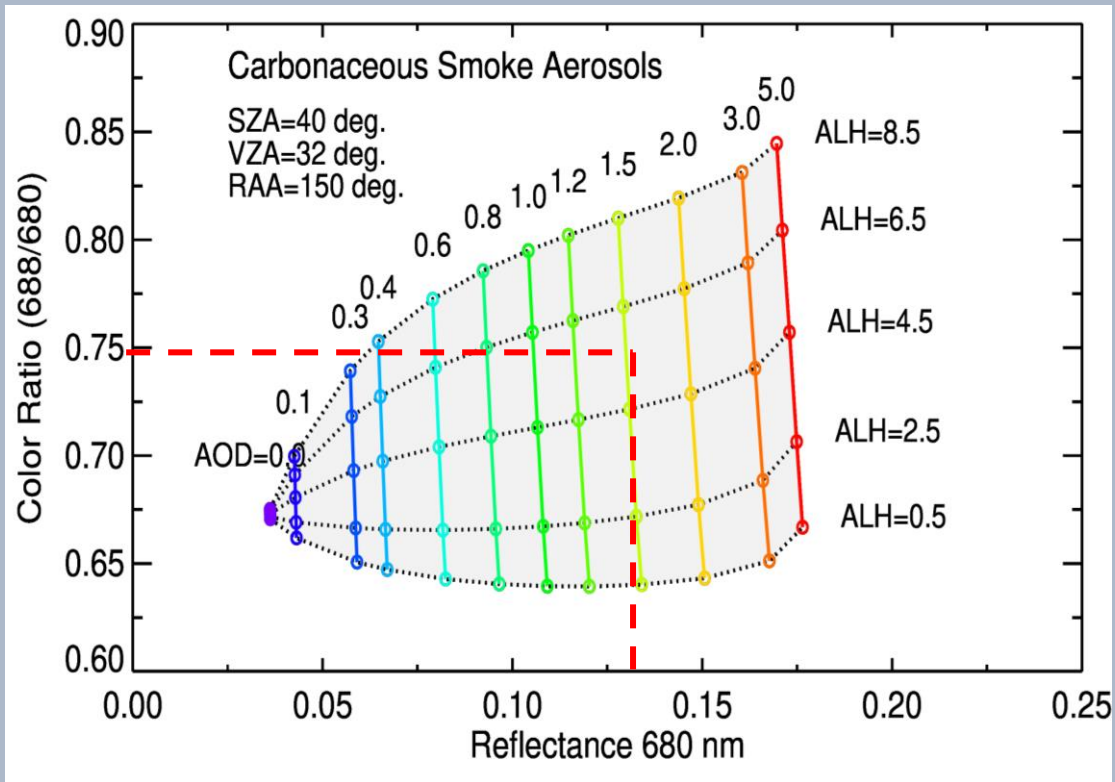
A new generation UV-VIS aerosol retrieval algorithm

Sensors with combined UV-VIS (including O₂B) observing capabilities

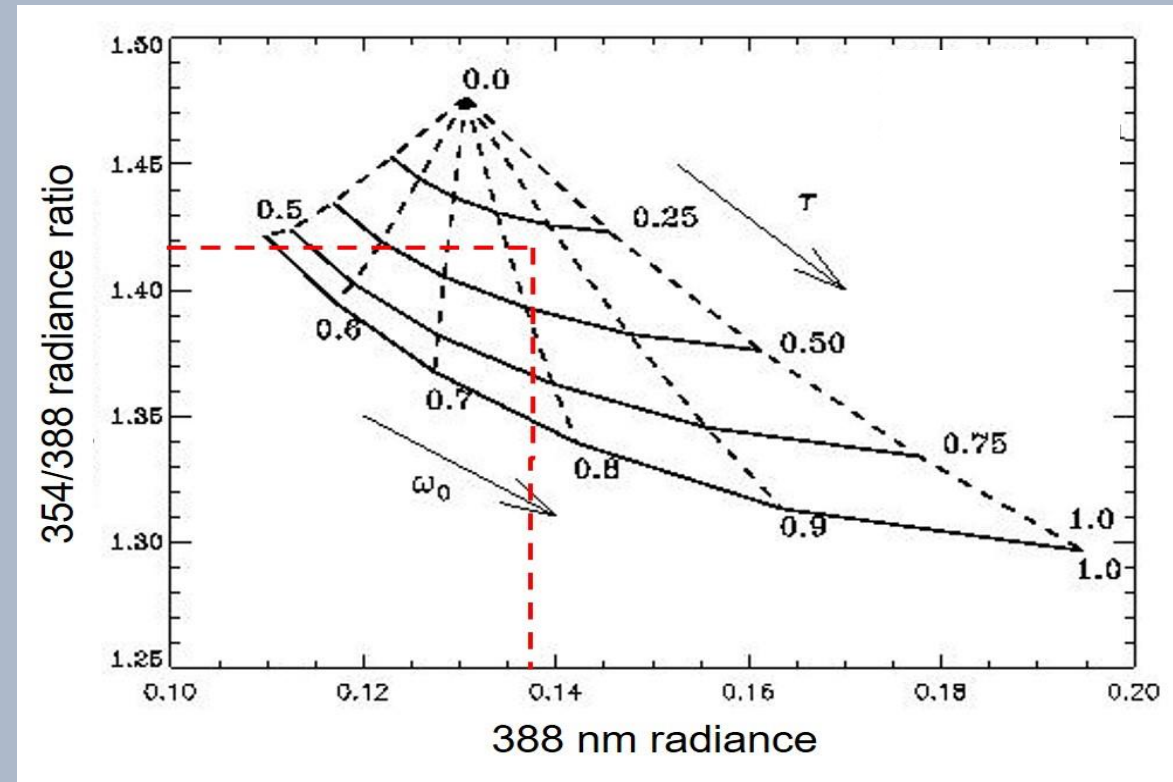
Agency	Sensor	Satellite	Spectral range of observations (nm)	Resolution	Period
NASA	EPIC	DSCOVR	318,340, 388, 443,551,680,688,764,780	~ 18 km	2015-Present
EU (Copernicus)	TROPOMI	Sentinel 5 Precursor	270-500; 675-775 & 2305-2385 (Hyp.)	3.5X5.5 km	2018-Present
NASA-SAO	TEMPO	Intelsat-40	290-490 & 540-740 (Hyp.)	2.1x4.7	2023-Present
NASA	OCI	PACE	340-890 nm (5nm steps)	1 km	2024 (Sched.)

Several recently deployed sensors with UV-VIS spectral observing capability at moderate spatial resolution, include O₂A/B bands that enable aerosol layer height retrieval.

Full ALH, AOD, SSA Retrieval Capability



ALH and 680 nm AOD can be simultaneously retrieved from EPIC observations at 680 and 688 nm.

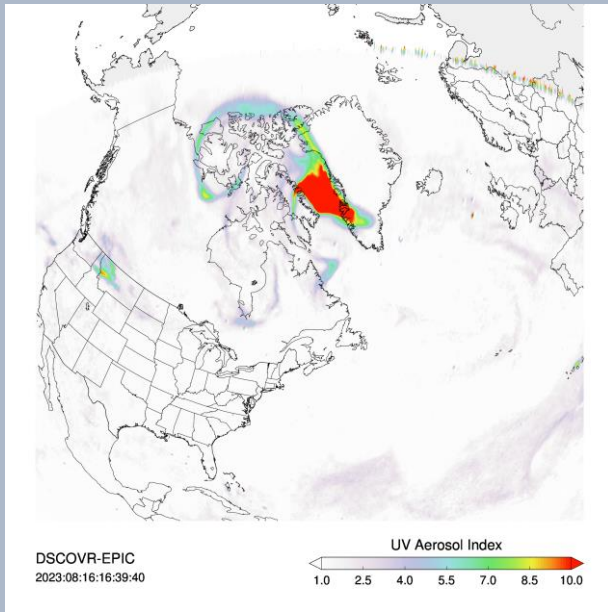


388 nm SSA and AOD are retrieved from EPIC near UV observations and derived ALH

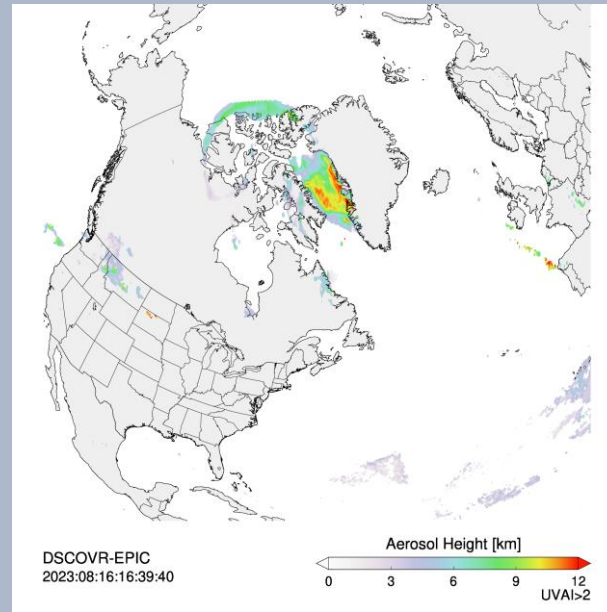


Application to EPIC (EPICAERUV) Observations on Aug. 16, 2023

UVAI

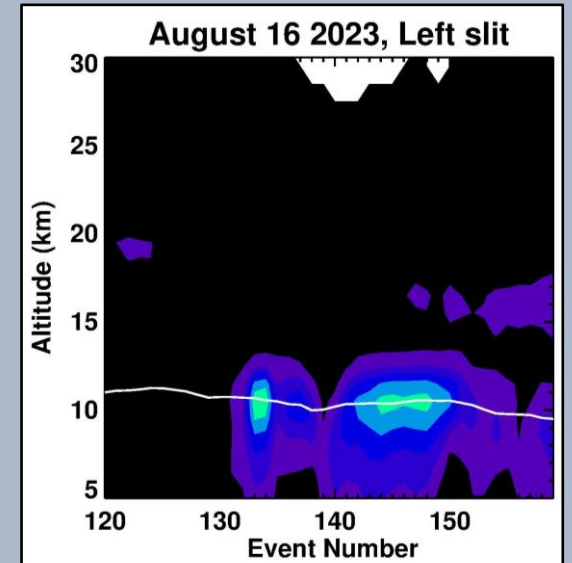


ALH

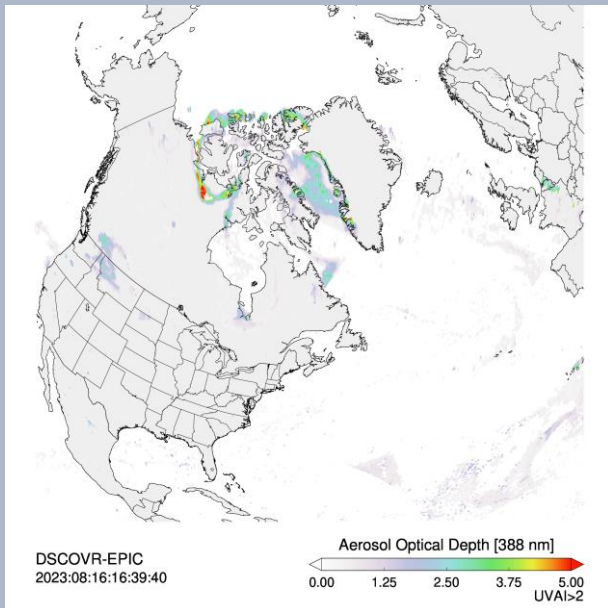


SNPP-Limb Profiler

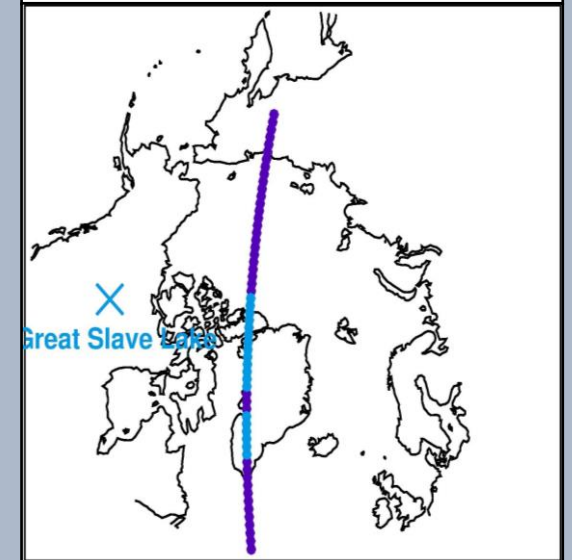
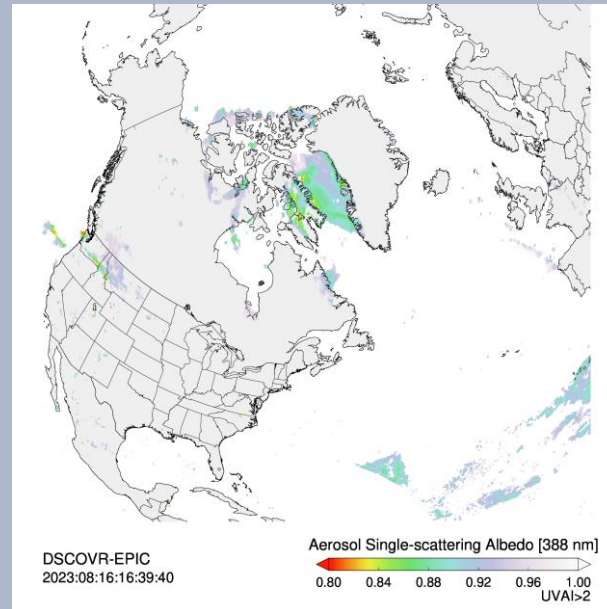
997 nm aerosol/Rayleigh Ext. Ratio
Courtesy of Ghassan Taha (614)



AOD



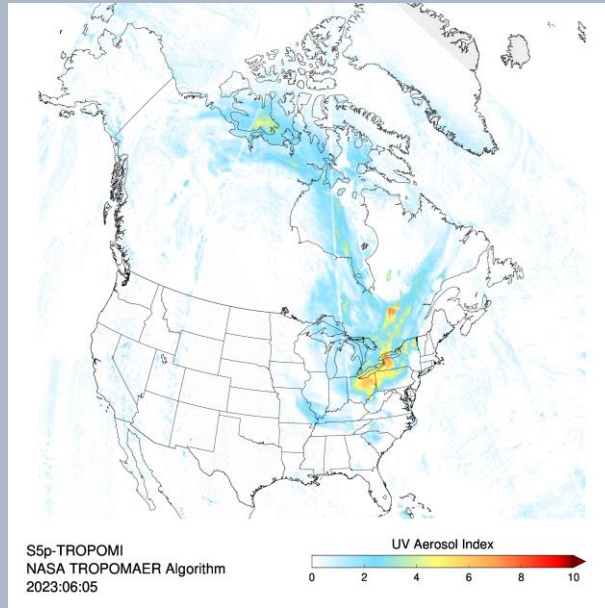
SSA



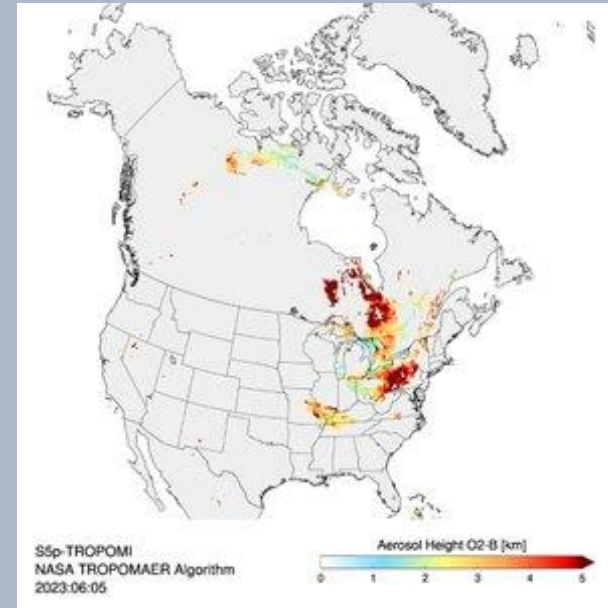
Smoke plume reached the Arctic stratosphere

Application to TROPOMI Observations on June 5, 2023

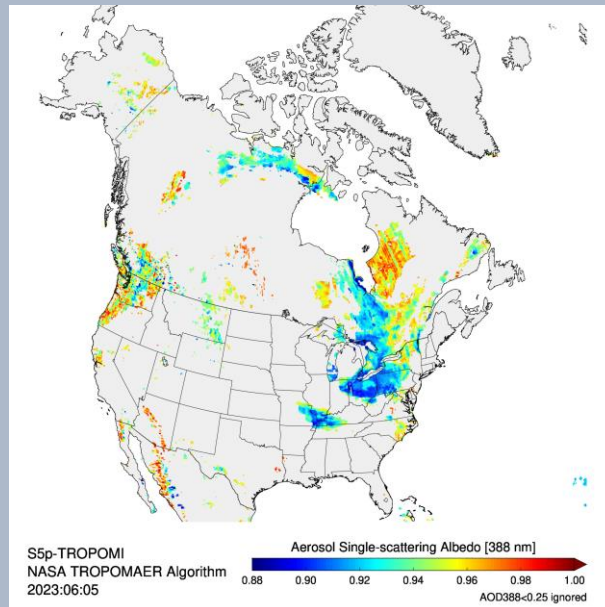
UVAI



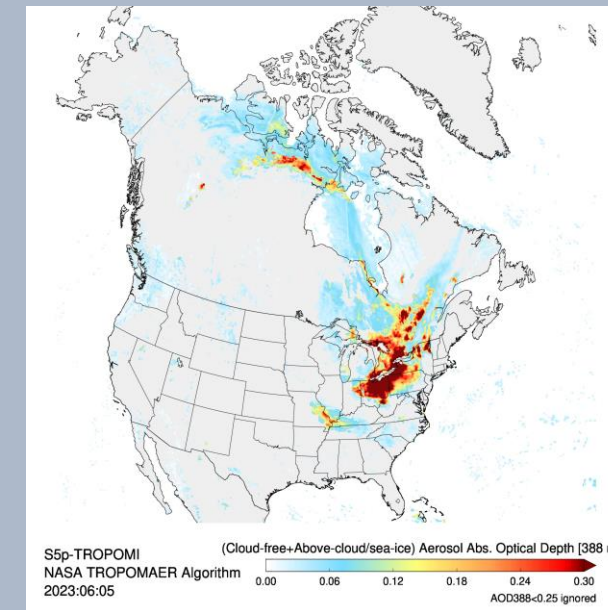
ALH



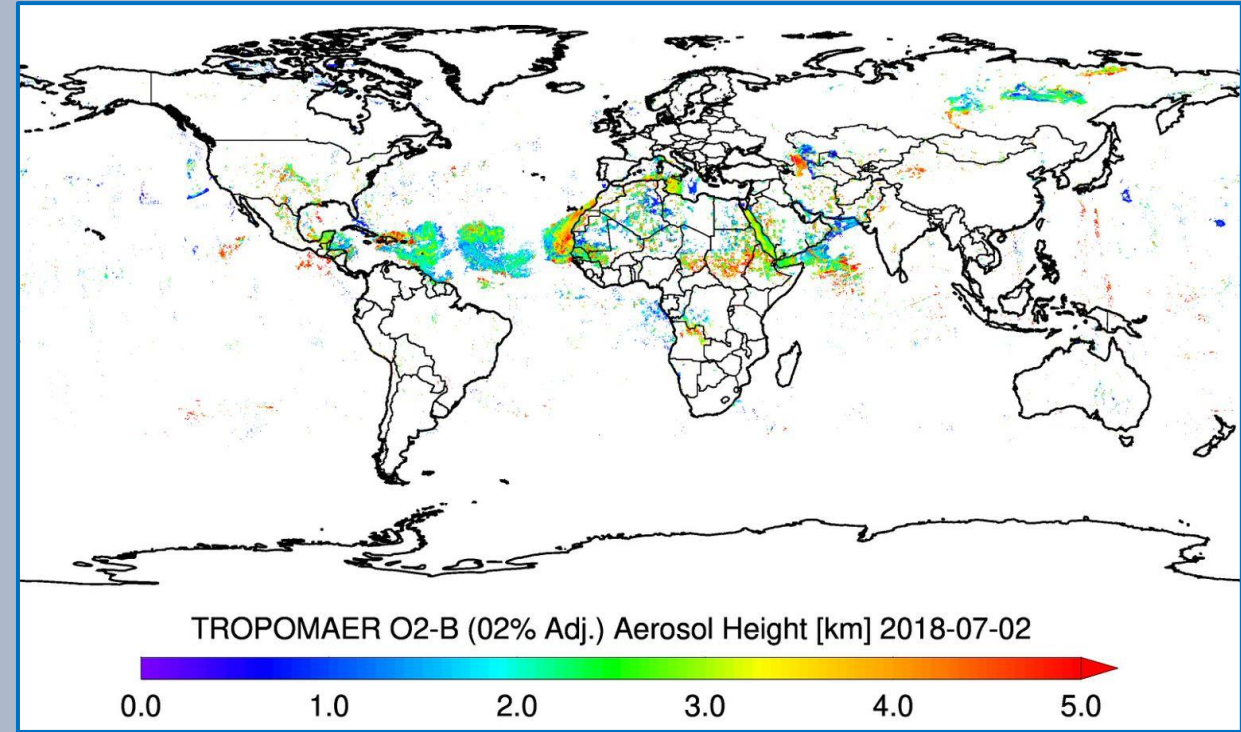
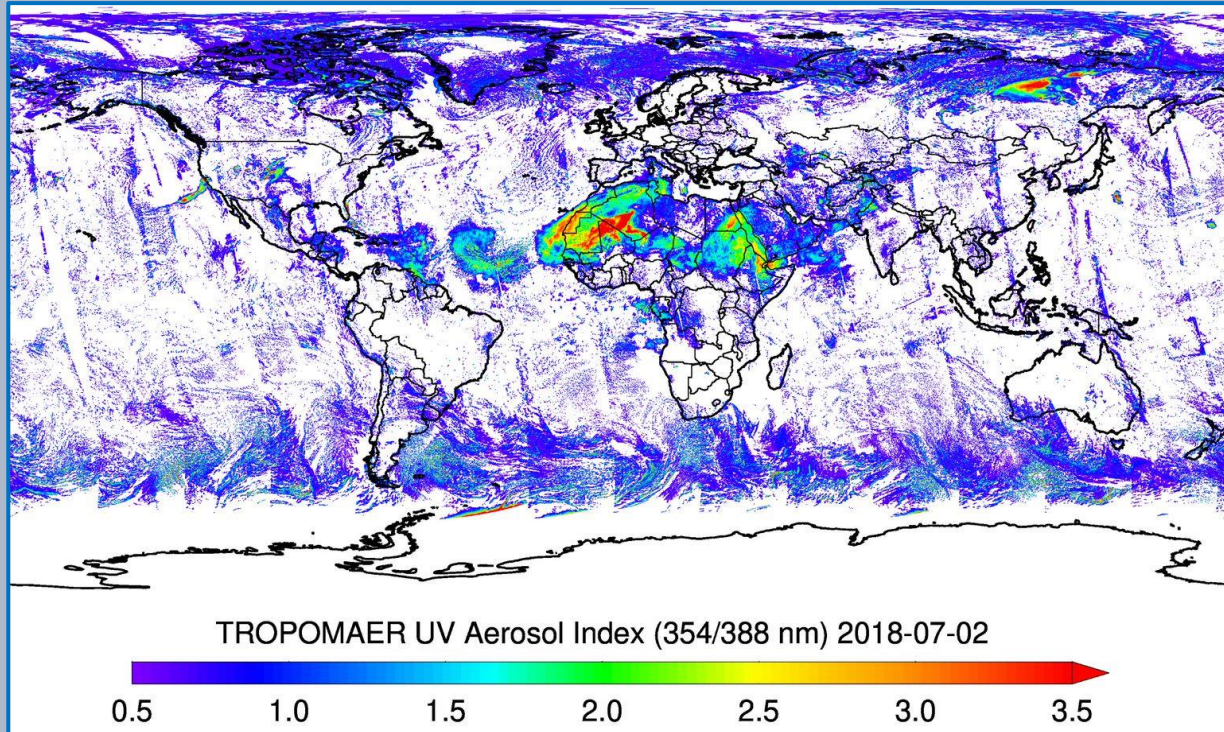
388 nm SSA



388 nm AAOD



TROPOMAER Global Retrievals of Aerosol Layer Height





Summary

- OMI & TOMS heritage UV aerosol algorithm have been successfully applied to TROPOMI (TROPOMAER) and EPIC (EPICAERUV) observations.
- Oxygen-B band ALH retrievals have been operationally implemented on both TROPOMAER and EPICAERUV algorithms.
- Reduced uncertainty in retrieved AOD/SSA (due to previous ALH assumption) is expected.