GEMS Aerosol Retrieval Algorithm

5yr minimum LER as surface reflectance from UV-Vis

Pre-selected aerosol type

(e) Initial guess values:
- Retrieve AOD, SSA for assumed ALH
- 2channel method

(f) Retrieve ALH with OE
- AOD and SSA at 354nm, 443nm, 500nm
- UV aerosol index (354/388nm)
- Aerosol Loading Height

GEMS Final Aerosol Products
- AOD and SSA at 354nm, 443nm, 500nm
- UV aerosol index (354/388nm)
- Aerosol Loading Height

From AERONET Inv. data → Using 3 models (HAF, DUST, NA)

Calculated TOA reflectance → Measured TOA reflectance

Online Process

RTM (VLIDORT) → considering bi-modal aerosol volume size distribution [Spurr et al., 2012]

Test w/TROPOMI L1
2019.03.4

GEMS AEH (Red Circle)
CALIOP Height (Black Circle)

Go et al., (RSE, 2020)
Data Fusion: GEMS, AMI & GOCI2

2018.04 – 2019.03

Lim et al. (RS, 2018), Go et al. (in preparation)

JIHUNG KIM (jkim2@yonsei.ac.kr)
Machine Learning: From Column to Surface

Satellite AOD + MET. data + GIS information

China

Japan

Mongolia

South Korea

North Korea

PM$_{2.5}$ [μg/m$^3$]

Estimated PM$_{2.5}$  Measured PM$_{2.5}$

Estimated PM$_{2.5}$  Measured PM$_{2.5}$

Estimated PM$_{2.5}$  Measured PM$_{2.5}$

Estimated PM$_{2.5}$  Measured PM$_{2.5}$