MAIAC Processing of OCI Over Land: High Resolution Aerosol Retrievals and Atmospheric Correction

PI: Alexei Lyapustin, NASA GSFC, code 613

Co-I's: Y. Wang (UMBC), S. Korkin (USRA), S. Go (UMBC)
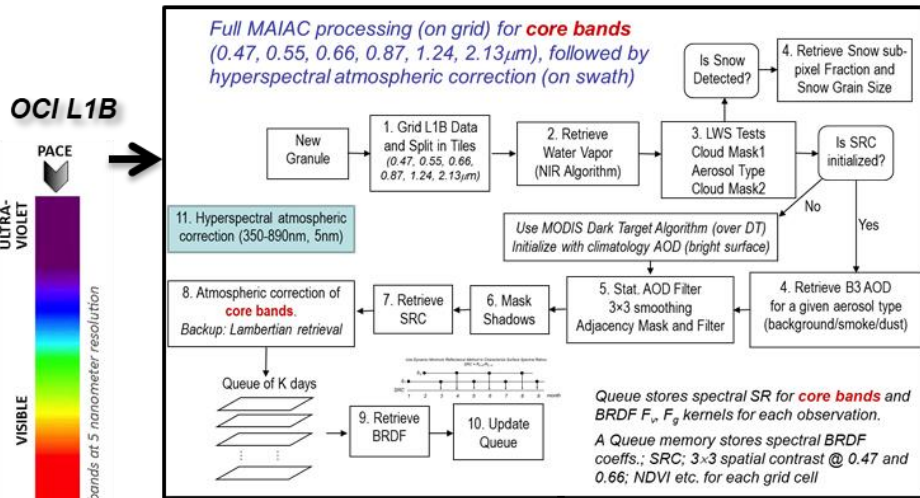
Objectives

➢ Develop MAIAC-based algorithm for the atmospheric correction of OCI measurements over land

➢ Prototype and test developed algorithm with TROPOMI data

➢ Study possibility of extended aerosol retrievals, including height and spectral absorption, from the combination of OCI and spectropolarimetric data
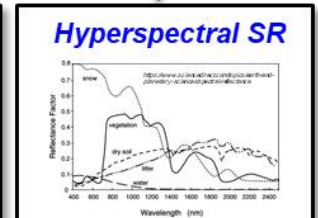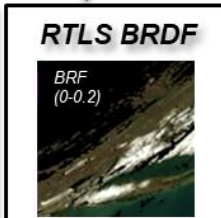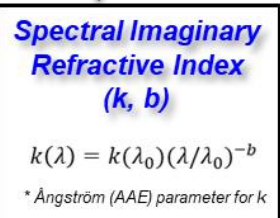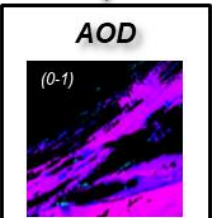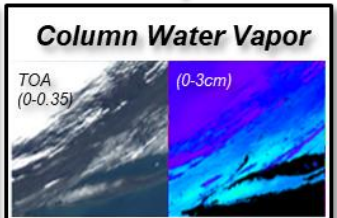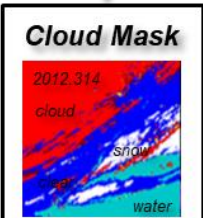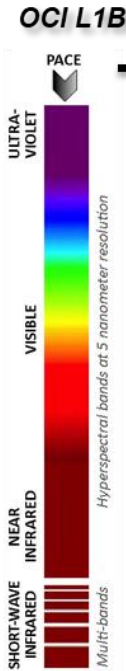
Products (~1-2km OCI, ~7km TROPOMI)

➢ **Atmosphere**:

✓ CM; WV; AOD; spectral imaginary refractive index (k, b) for smoke and dust;

➢ **Land Surface**:

✓ K_{iso}, K_{vol}, K_{geo} – coefficients of RTLS BRDF model (0.47, 0.55, 0.66, 0.87, 1.24, 2.13µm).

✓ Hyperspectral SR (BRF): ~80-100 values per pixels for 350-890nm range with 5nm step in atmospheric windows

Full MAIAC processing (on grid) for **core bands** (0.47, 0.55, 0.66, 0.87, 1.24, 2.13µm), followed by hyperspectral atmospheric correction (on swath)

OCI L1B

Queue stores spectral SR for **core bands** and BRDF F_v, F_g kernels for each observation.

A Queue memory stores spectral BRDF coeffs.; SRC; 3×3 spatial contrast @ 0.47 and 0.66; NDVI etc. for each grid cell

Validation (Reference)

AERONET (AOD, k, b)   **GPS/ARM (CWV)**   **TROPOMI DLR Hyperspectral SR**   **MCD19 @ core bands**

Cloud Mask

Column Water Vapor

AOD

Spectral Imaginary Refractive Index (k, b)

$$k(\lambda) = k(\lambda_0)(\lambda/\lambda_0)^{-b}$$

* Ångström (AAE) parameter for k

RTLS BRDF

Hyperspectral SR

* TROPOMI: will use the high spatial resolution (1km) MAIAC MODIS Aqua (VIIRS) cloud mask, water vapor and aerosol information as an ancillary data