

The Dark Target retrieval algorithm applied to a constellation of imagers: towards an integrated view of global aerosol

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The relatively simple dark-target (DT, [1]) aerosol retrieval algorithm provides products of spectral aerosol optical depth (AOD) from measurements of multi-spectral reflectance (intensity) provided by passive imagers in visible, near-infrared and shortwave infrared wavelength bands. Originally developed for Moderate-resolution Imaging Spectroradiometer (MODIS), the DT algorithm has been ported to other sensors in Low Earth Orbit (LEO) [2], to airborne sensors [3], and now recently to sensors in Geostationary orbit (GEO) [4]. While the LEO experience has greatly improved our understanding of global aerosol over the past two decades, the new-generation GEO imagers allow for retrieval of the daylight diurnal cycle. To date, we have ported the DT algorithm to Advanced Himawari Imager on Japan's Himawari-8 (AHI-8) satellite and Advanced Baseline Imagers on NOAA's GOES-16 and 17 (ABI-16 and ABI-17) platforms. With a consistent DT algorithm on LEO and GEO sensors, we now have a framework for more complete observations of global aerosol transport and lifecycle. Here, we report on some of our project's challenges such as: managing the size of the data and the complexity of the computer processing, accounting for differences between GEO and LEO observation geometry and radiative transfer, and creating a LEO-GEO aerosol product that is complete, yet streamlined and useful for the community. Being relatively simple in 'radiation space', this framework helps baseline retrievals and science from more complex sensors in the future.

References

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