

# Use of non-spherical aerosol models within the Dark Target aerosol retrieval over ocean

Robert C. Levy<sup>a,\*</sup>, Yaping Zhou<sup>b,a</sup>, Shana Mattoo<sup>c,a</sup>, and W. Reed Espinosa<sup>a</sup>

<sup>a</sup>NASA Goddard Space Flight Center, Code 613, Greenbelt, MD, USA

<sup>b</sup>GESTAR-Morgan State University, Baltimore, MD, USA

<sup>c</sup>SSAI, Lanham, MD, USA

\*Presenting author ([robert.c.levy@nasa.gov](mailto:robert.c.levy@nasa.gov))

The Dark-target (DT) aerosol retrieval has been running operationally on Moderate-resolution Imaging Spectrometer (MODIS) since 2000 (Terra) and 2002 (Aqua), creating a time series of spectral aerosol optical depth (AOD) over land and ocean. Recently, DT is also running on Visible Infrared Imaging Radiometer Suite (VIIRS) aboard Suomi-NPP. Over the ocean, the DT algorithm is known to provide biased retrievals of AOD, Angstrom Exponent (AE) and fine mode weighting (FMW), especially in scenes known to be dust of African or Asian origin. We believe that these biases arise from not using appropriate dust optical models, which in the current algorithm are assumed to be spherical. This leads to wrong phase functions which leads to AOD and AE biases which are dependent on angles. We have been experimenting with a two-step process for retrieving dust aerosol: (i) detection of dust using combined deep-blue, visible and IR radiances, then (ii) using lookup tables (LUTs) derived from non-spherical models for the retrieval. What optical properties should we be using to create the LUTs in step (ii)? Here, we generated ensembles of LUTs using different dust shapes (spheres, spheroids, ellipsoids) from different codes (GRASP and earlier versions) and databases (Texas A&M), each time characterizing the retrieval sensitivity on size, shape, refractive indices, and volume vs surface area equivalency assumptions. We have tested on sample MODIS granules and show how the different models/assumptions affect the retrieval of AOD and AE as a function of solar/observing geometry.

Preferred mode of presentation: Oral or Poster