

# High-resolution aerosol remote sensing retrieval using Chinese High-Resolution Earth Observation Satellite I (GF-1) wide-field images (WFI) and MODIS surface products

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The high-spatial-resolution aerosol retrieval algorithm using Chinese High-Resolution Earth Observation Satellite I (GF-1) wide-field images is developed, which retrieves the 1km aerosol optical depth (AOD) over China based on the red/blue surface reflectance correlations and the lookup table method. To reduce the enormous relative error caused by the constant surface reflectance relationship in the retrieval algorithm, the correlation is parameterized as a function of low, medium, and high values of normalized difference vegetation index (NDVI). Three linear relationships are simulated using MODIS BRDF-adjusted reflectance products (MCD43A4), and MODIS NDVI products are used to ascertain the value of NDVI. The retrieved AOD results are found to be highly correlated with Aerosol Robotic Network (AERONET) sunphotometer observations ( $R = 0.931$ ) and MODIS AOD productions ( $R = 0.912$  for Dark Target AOD and  $R = 0.895$  for Deep Blue AOD). Compared with the results relying on the MODIS surface reflectance model, preliminary validation is encouraging that the method based on our updated surface reflectance assumptions successfully improved the accuracy, particularly under the clear sky background and over bright surface.

Keywords: Aerosol Optical Depth, High resolution observation, Chinese High-Resolution Earth Observation Satellite I