

DATA FILTERING AND ASSIMILATION OF SATELLITE DERIVED AEROSOL OPTICAL DEPTH

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This work falls under the direction of the NASA CERES ¹ (Clouds and the Earth's Radiant Energy System) mission SARB (Surface Atmosphere Radiation Budget) project. Its purpose is to provide SARB a suitable global aerosol dataset for use in radiative transfer calculations of CERES constrained atmospheric and surface radiative fluxes. The requirements of the analysis are daily aerosol fields, 2000 - present, constrained by AOD (Aerosol Optical Depth) estimates from the MODIS ² (Moderate Resolution Imaging Spectro Radiometer) sensors on the Terra and Aqua spacecraft. Validation of the aerosol analysis is through comparisons with the MISR ³ (Multi-Angle Imaging Spectro Radiometer) and AERONET ⁴ (Aerosol Robotic Network) derived AODs.

The analysis system is based on the aerosol transport model MATCH ⁵ (Model for Atmospheric Transport and Chemistry). This model was used in conjunction with MODIS to provide aerosol fields for SARB Edition 2 processing. SARB Edition 4 improvements have been incorporated into MATCH and are described in this report. An alternative, simpler, aerosol analyses derived from MODIS has also been implemented which uses a multi-resolution spatial interpolation method.

There were three primary objectives of this project.

- Design and implementation of a multi-resolution AOD filter for smoothing and interpolation of MODIS based AOD estimates.
- Development and delivery of a MATCH aerosol analysis for use in CERES SARB Edition 4 processing.
- Creation of a MODIS IDL (Interactive Data Language) module with an interface to ENVI ⁶ (Environment for Visualizing Images) suite.

¹<http://science.larc.nasa.gov/ceres>

²<http://modis.gsfc.nasa.gov>

³<http://www-misr.jpl.nasa.gov>

⁴<http://aeronet.gsfc.nasa.gov>

⁵<http://www.cgd.ucar.edu/cms/match>

⁶<http://www.itvis.com/ProductServices/ENVI.aspx>