

## Data Filtering and Assimilation of Satellite Derived Aerosol Optical Depth

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Proposal No: S6.03-9671

### Identification and Significance of Innovation

We propose to explore new filtering and data assimilation techniques for satellite derived aerosol optical depth based on the spherical wavelet transform. Phase I will focus on aerosol measurements from the Moderate Resolution Imaging Spectroradiometer (MODIS) instruments flying on the Terra and Aqua satellites. An interface to the Data Assimilation Research Testbed (DART) coupled to the Community Atmosphere Model (CAM) 4 will be constructed. The aerosol filter and assimilation system will produce datasets for application to Earth radiation budget studies and atmospheric correction methods.

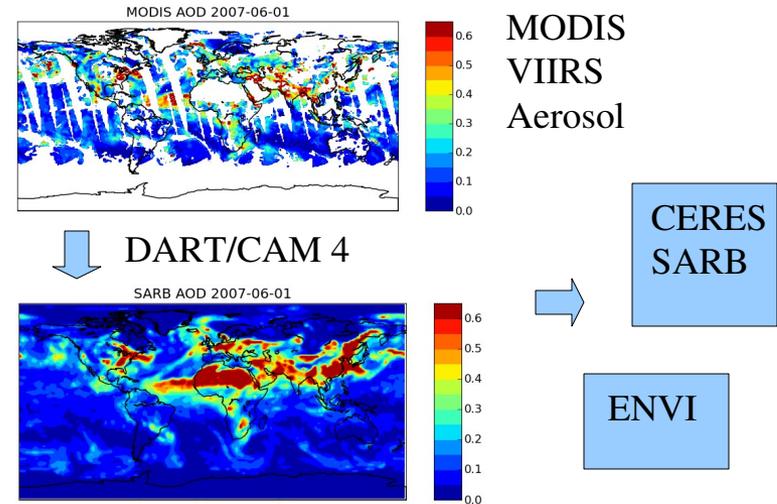
Expected TRL Range at the end of Contract (1-9): 4-5

### Technical Objectives

We will prototype a spherical wavelet filter and demonstrate that it can smooth and interpolate high resolution, satellite derived aerosol optical depth. It will be interfaced to the NCAR DART assimilation system and trial aerosol simulations will be provided to the NASA CERES project.

### Work Plan

- Task 1: Build Prototype Wavelet Filter
- Task 2: Test Filter with MODIS
- Task 3: Construct MODIS Error Covariance Matrices
- Task 4: Interface to DART/CAM 4
- Task 5: Provide Trial Datasets to CERES/SARB



### NASA Applications

In collaboration with the National Center for Atmospheric Research (NCAR), phase I/II will produce an aerosol dataset for the Clouds and the Earth's Radiant Energy System (CERES) Surface and atmosphere Radiation Budget (SARB) subsystem.

### Non-NASA Applications

Phase II will build an atmospheric correction package for the Environment for Visualizing Images (ENVI) geospatial software suite, incorporating smoothed aerosols from MODIS and its successor, the Visible Infrared Imager Radiometer Suite (VIIRS).

### Firm Contacts

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