The combined use of CALIOP, MODIS and OMI level 2 aerosol products for calculating direct aerosol radiative effects

Abstract

We describe a technique for combining CALIOP aerosol backscatter, MODIS spectral AOD products, and OMI single scattering properties to airborne HSRL (High Spectral Resolution Lidar) and in situ sunphotometer measurements for the purpose of calculating direct aerosol radiative effects. In the test of our method, we applied our multi-step methodology to calculating direct radiative forcing over the stratosphere for the MODIS Terra and Aqua (Collection 5) Aerosol products and the OMI lidar products. We describe a technique for combining CALIOP aerosol backscatter, MODIS spectral AOD products, and OMI single scattering properties to airborne HSRL and in situ sunphotometer measurements for the purpose of calculating direct aerosol radiative effects. In the test of our method, we applied our multi-step methodology to calculating direct radiative forcing over the stratosphere for the MODIS Terra and Aqua (Collection 5) Aerosol products and the OMI lidar products. We describe a technique for combining CALIOP aerosol backscatter, MODIS spectral AOD products, and OMI single scattering properties to airborne HSRL and in situ sunphotometer measurements for the purpose of calculating direct aerosol radiative effects. In the test of our method, we applied our multi-step methodology to calculating direct radiative forcing over the stratosphere for the MODIS Terra and Aqua (Collection 5) Aerosol products and the OMI lidar products.

Methodology: Retrieval of aerosol radiative properties from A-Train observations (or suborbital measurements)

Comparison geometry: CALIPSO V2 vs. MODIS MYD04_L2 AOD

Comparison of CALIPO V2 and V3 AOD(532nm) to collocated MODIS MYD04_L2 AOD


Comparison of CALIPSO V2 to MODIS MYD04_L2 for Jan. and Oct. 2007

Application 1: 1 month data set - October 2007

Application 2: Test of method with suborbital data

Test of method with suborbital and reduced input data:

Use aerosol radiative properties in a radiative transfer model and calculate spectral radiative fluxes for comparison with in-situ spectral flux measurements or MODIS/Terra data.