



Optical Properties of Aerosol Types from Satellite and Ground-based Observations

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In this study, the properties of aerosol types are characterized from the aspects of remote sensing and in situ measurements. Particles of dust, smoke and anthropogenic pollutant are selected as the principal types in the study. The measurements of AERONET sites and MODIS data, during the dust storm and biomass burning events in the period from 2002 to 2008, suggest that the aerosol species can be discriminated sufficiently based on the dissimilarity of AE (Ångström exponent) and SSA (single scattering albedo) properties. However, the physicochemical characteristics of source aerosols can be altered after the external/internal combination along the pathway of transportation, thus induce error to the satellite retrievals. In order to eliminate from this kind of errors, the optical properties of mixed aerosols (external) are also simulated with the database of dust and soot aggregates in this study. The preliminary results show that SSA value (at 470 nm) of mineral dust may decay 5-11 % when external mixed with 15-30 % soot aggregates, then result in 11-22 % variation of reflectance observed from satellite which could lead to sufficiently large uncertainty on the retrieval of aerosol optical thickness. As a result, the effect of heterogeneous mixture should be taken into account for more accurate retrieval of aerosol properties, especially after the long-range transport.

Keywords: Aerosol type, Ångström exponent, Single scattering albedo, AERONET, MODIS, External mixture