Abstract Details

AOGS 1st Annual Meeting > Ocean and Atmospheres > Light Extinction Properties at Gosan derived from the Ace-Asia Using Size-resolved Multicomponent Aerosol model >

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Title: Light Extinction Properties at Gosan derived from the Ace-Asia Using Size-resolved Multicomponent Aerosol model

Abstract: Surface aerosol single scattering albedo and light extinction coefficient are derived using a size-resolved multicomponent aerosol model based on the measurements at Gosan, Jeju, Korea, from April 10 to 15 during the ACE-Asia field campaign. A multicomponent aerosol model is employed to describe the nucleation, condensation/evaporation, coagulation, and deposition processes of aerosol in order to estimate the light extinction propertied during both Asian Dust period and Non-Asian Dust period. Aerosol size, composition, and hygroscopic behavior from the measurement at Gosan during ACE-Asia are used to construct a genetic optical model and applied to explicitly account for the effect of mixing assumptions (such as internal versus external mixing) and various shape irregularities. The results showed that the measured single scattering albedo and light extinction coefficient are 0.90 and 60 mm-1 for Non-Asian Dust period (the first half of simulation period), and 0.92 and 257 mm-1 for Asian Dust period (the second half of simulation period), respectively. The simulated variability of single scattering albedo is slightly overestimated for both Asian Dust period and Non-Asian Dust period. The simulated light extinction coefficients are similar to the observations for Asian Dust period, but underestimated for non-Asian Dust period. However the assumption of internal mixing significantly decrease the light extinction coefficient at least by a factor of 4 for Asian Dust period, while the light extinction properties are not sensitive to the mixing assumption for non-Asian Dust period, suggesting the importance of mixing process for the simulation of the aerosol formation during the Asian Dust period. The model simulate the non-spherical dust radiative properties that the scattering tends to be strongly dependent on geometry whereas the absorption is not significantly sensitive to geometry for both Asian Dust period and non-Asian Dust period

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