



Long-term aerosol trends over East Asia and its climate implication

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East Asia is one of the largest source regions of gaseous pollutants and aerosols due to the rapid industrialization, urbanization and the population growth and has experienced air quality deterioration over the past. Increases in anthropogenic emissions are a main cause for the air quality degradation that is also sensitive to changes in climate conditions. We examine the long-term aerosol concentrations in East Asia using the 3-D chemical transport model (GEOS-Chem) simulations for the period of 1985-2006. The model was driven by the GEOS assimilated meteorology with the emission estimates from the Streets et al. inventory with annual scale factors of Regional Emission inventory in Asia (REAS). Over the past two decades precursor emissions have been dramatically changed. Our model simulations show that sulfate-nitrate-ammonium aerosol concentrations are increased, whereas those of BC and OC are decreased. We computed the radiative forcing of aerosols as a measure of climate impact and found that increased cooling effect at the surface and top of the atmosphere, but decreased warming effect in the atmosphere. This result implies that the long-term aerosol concentrations may affect the regional climate over East Asia.