

Impact of aerosols on climate change in East Asia

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Earth systems are significantly impacted by aerosols, while increasing atmospheric greenhouse gas concentrations represent the largest contributor to global warming. A significant amount of research has shown that aerosols and their interactions with clouds offset a substantial portion of global mean forcing from greenhouse gases. However, they continue to contribute the largest uncertainty to estimations of the Earth's energy budget. Emissions of anthropogenic aerosols have increased since the industrial revolution, while the largest source of anthropogenic aerosols emissions shifted from Europe to East Asia during the second half of the twentieth century. With economic growth and air pollution in megacities, aerosol concentrations in East Asia have become a serious problem and are now the highest in the world. Changes in aerosol concentrations affect climate by directly and indirectly modifying the optical properties and lifetimes of clouds. In addition to radiation budget change, aerosols have a significant potential to alter clouds and precipitation. This study aimed to investigate the distribution of aerosols over East Asia and to estimate their impact on regional climate change by using an earth system model.

Keywords: Anthropogenic aerosols, GCM, radiation budget