



Impact of aerosols on the Asian summer monsoon rainfall

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Asia is among the most polluted continents in the world due to the large population and expansive deserts. We simulate the impact of aerosols on the East Asian summer monsoon rainfall using the NASA Seasonal-to-Interannual Prediction Project (NSIPP) Atmospheric General Circulation Model (AGCM) with the aerosol optical properties taken from MODIS retrievals. During boreal summer and over land, aerosols reduce significantly the solar radiation at the top of the atmosphere, leading to reductions in the surface temperature and the land-sea temperature contrast. Corresponding to the reduced land-sea temperature contrast, both the Asian low pressure center and the Pacific high pressure center weaken. The surface evaporation and precipitation decrease in East Asian due to aerosols, whereas the precipitation increases in the surrounding regions ranging from Japan, the Philippines, Malaysia, and the northern India. This is in essence a weakened East Asian summer monsoon. The changes in the patterns of atmospheric circulation and precipitation induced by aerosols are similar to that between the periods 1955-1975 and 1980-2000 when there is a temperature jump during the period 1975-1980.