

Contribution of natural and anthropogenic forcings to the summer cooling over East China: An AGCM estimation

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Abstract. In order to evaluate the natural and anthropogenic contribution to the summer cooling over China, one control run and three experiments are performed using Version 1.1 of the Grid-point Atmospheric Model of IAP LASG (GAMIL1.1), an atmospheric general circulation model (AGCM), forced by the same observed sea surface temperature and sea ice cover but by different temporal natural (solar irradiance) and anthropogenic (greenhouse gases and sulfate aerosols) forcings included. When all forcings are included, the GAMIL1.1 could reproduce this cooling, although the cooling center shifts northward relative to the observation, and the top of atmosphere solar irradiation changes. The sulfate aerosol and solar irradiation changes should be responsible for this cooling through thermal and a possible negative feedback mechanism, and the effect of the former is greater than the latter. The increases of greenhouse gases warmed most part except the coastline region, where attributes to more rainfall.