



Decadal scale, seasonal climate effects of aerosols in China

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China is a hot spot in terms of population growth and industrialization. This development is accompanied by a substantial increase in aerosol emissions. We investigate associated impacts of different aerosol emissions on surface solar radiation (SSR), surface air temperature (SAT), and precipitation by means of the global atmosphere only climate model ECHAM5-HAM (aerosol emission data from NIES, the National Institute of Environmental Studies, Japan; prescribed, observation based sea surface temperatures (SSTs) from the Hadley Center). Ensembles of transient (1870 - 2005) sensitivity experiments are performed and analyzed on a seasonal basis. We discuss corresponding findings, among them that inclusion of aerosol emissions leads to a decrease of modeled SSR of around -7 W/m^2 in eastern parts of China in recent decades, in good agreement with in situ observations of SSR changes. The associated cooling leads to better agreement between modeled and measured SAT time series, especially in summer. By contrast, the precipitation reduction brought about by aerosols in the model is rather strong compared to observations.