

## Climate change in China simulated in a 20th century run with a climate model

# Tatsuya Nagashima[1]; Toru Nozawa[1]; Tadahiro Hayasaka[2]

[1] NIES; [2] RIHN

Significant long-term trends in various climate elements in China have been observed in recent decades. The elements include surface temperature, precipitation, evaporation, surface insolation, cloud cover, etc. It is of particular interest that coexistence of decreasing trends both in solar radiation and cloud cover have been observed over most of China, since a decreasing trend of solar radiation would be expected to be accompanied by an increasing trend of cloud cover that reduces the radiation from the sun. Here, we investigate the cause of this confusing fact with the aid of a 20th century simulation performed with the climate model developed by the Center for Climate System Research of University of Tokyo (CCSR), the National Institute for Environmental Studies (NIES), and the Frontier Research Center for Global Change (FRCGC).

Simulated trend in solar radiation shows the decreasing trend over entire China, but the trend averaged over China is about  $-1.0$  W/m<sup>2</sup> which is smaller than observed trend. While the simulated trend in cloud cover averaged over China is indiscernible as opposed to the observation, a small but significant decreasing trend similar to the observation could be simulated in the southern part of China. In the southern part of China, our model could capture the coexistence of decreasing trends both in solar radiation and cloud cover, which could also be simulated an experiment forced only anthropogenic climate forcings (i.e. increases in greenhouse gases and aerosols). Further experiments forced only the increase in greenhouse gases or anthropogenic aerosols reveals the relative importance of both forcings.