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The analysis of anthropogenic factors in regional temperature change over East Asia

Xiaodan Guan, Jianping Huang, and Ruixia Guo
Lanzhou University, China (guanxd@lzu.edu.cn)

In this study, the variability of surface air temperature (SAT) over different types of regions in East Asia are studied by using observation data from 1980-2012 under fast developing in economic. We found that the warming trends of the semi-arid regions are higher than other lands, which have increased 2.42°C as compared to the global annual mean temperature increase of 1.13°C over land. To investigate the causes of Enhanced Semi-Arid Warming (ESAW), we used an advanced dynamic-adjusted method proposed by Wallace et al. (2012) to analyse the adjusted temperature change. Our results point that the aerosol maybe takes the main role in adjusted temperature, especially in cold season. The anthropogenic-warming peak over semi-arid region plays the main role in the ESAW. Such anthropogenic-warming peak may be related to the long wave radiation change induced by aerosol in the air or the reduction of snow cover due to black carbon (BC) emission by fuels for winter residential heating. Besides the impact of aerosol over semi-arid region, the agricultural mulch creation, wind farms and other types of human activities may also make attribution to local SAT changes that need to be further studied.