



Relationships between climate variability and interannual variations of surface ozone concentrations in East Asia

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Ozone (O_3) plays an important role in climate change as the third most important greenhouse gas, and acts as a highly reactive oxidant that affects the burdens of other important greenhouse gases and short-lived climate pollutants. In addition, O_3 is also a key compound for tropospheric chemistry, affecting the human respiratory system and ecosystem. We examine the effects of climate variability on the interannual variations of springtime surface O_3 concentrations in East Asia using a 3-D global chemical transport model (GEOS-Chem) for the past four decades (1980-2015). The model was driven by assimilated meteorological data from Modern-Era Retrospective analysis for Research and Applications (MERRA). First, we evaluate the model by comparing the observed and modeled O_3 concentrations from the Acid Deposition Monitoring Network in East Asia. The results indicate that the model well reproduces the spatial characteristics of the observed surface O_3 concentrations in East Asia. We perform the sensitivity simulation with the fixed anthropogenic emissions for the whole simulation periods to remove the effect of anthropogenic emissions changes on the model results. In order to find out significant meteorological factors contributing to the interannual variations of springtime surface O_3 changes during past four decades, we examine the spatial distributions of differences in meteorological fields and statistics between surface O_3 and meteorological fields over East Asia.