

5.044 Numerical Study on the Impacts of East Asia Summer Monsoon on Ozone formation in China.

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Abstract:

Ozone plays a key role in global climate change and atmospheric environment. Tropospheric ozone is not only a main greenhouse gas, but also a secondary pollutant. It has been known to the public because of extensive impacts on air quality, climate and human health. In this study, the inter-annual and seasonal variability of tropospheric ozone over East Asia were analyzed. The regional climate chemistry model (RegCM4+Chem) were evaluated and used to investigate the effects of East Asian Summer Monsoon(EASM) on ozone. Ozone variance analysis between strong and weak EASM proved that anomalies of EASM have a significant impact on spatial distribution of low layer ozone. Ozone was higher in the North during strong monsoon season and lower in the south during weak monsoon season. Ozone difference range between strong EASM and weak EASM was -6.5~6.9 ppb from May to August with the biggest difference in August. Average difference of 4 months ranged from -3 ppb to 3.8 ppb, accounting for -10% to 12.5% of the average ozone over the area. Process analysis indicated that advection and chemical reaction played the main role in the variation of ozone affected by EASM. Via wind and cloud, strength anomalies of EASM influenced transportation and chemistry formation of ozone and eventually lead to the differences of ozone spatial distribution at lower atmosphere.