

Regional pollutants transport over eastern China: a case study with lidar network observations and model simulations

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According to previous observations and studies, eastern China was suffering from severe particulate matter pollution. However, the formation of pollutants especially the influence mechanism of the regional pollutants transport is still unclear. In this study, the extinction coefficient and the height of the aerosol boundary layer(ABLH) in eastern China from November 30, 2017 to December 5th were obtained by 11 sets of networks lidar. Meanwhile, the WRF-Chem model was used to obtain the regional meteorological field and the PM2.5 three-dimensional field, and the regional transport flux was evaluated. The results showed that the ABLH in eastern China was decreased gradually. On December 2nd, the ratio of ABLH that was less than 0.5 km reached 50%, which inhibited the vertical diffusion of atmospheric pollutants in the eastern region. Under the action of southwest wind, the pollutants in the southern area are transported to the northern area and the local pollutants are accumulated, which makes the pollution area increase and the pollution concentration rise. Among them, Baoding, Beijing, Shijiazhuang, Tangshan and Xingtai have reached the peak value of pollution successively, and the maximum hourly concentration was $425 \mu\text{g m}^{-3}$, $299 \mu\text{g m}^{-3}$, $385 \mu\text{g m}^{-3}$, $337 \mu\text{g m}^{-3}$ and $336 \mu\text{g m}^{-3}$, respectively. Since December 3rd, northwest wind and northeast wind have made long-distance transportation of pollutants from Beijing-Tianjin-Hebei and surrounding areas to Yangtze River Delta, causing heavy pollution in Shanghai and Anhui provinces.