



Mixing layer transport flux of particulate matters in Beijing, China

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Quantifying the transport flux of atmospheric pollutants plays an important role in understanding the causes of atmospheric pollution and making decisions on prevention and control of atmospheric pollution. In this study, the mixing layer height and the wind profile in the mixing layer were measured by ceilometer and doppler wind radar respectively, and the variation characteristic of atmospheric transport capacity (TC) was analyzed by using these two sets of data. The research showed that the TC was strongest in spring and weaker in summer, autumn and winter. Combined with the near-surface fine particle concentration data, the influence of TC on the concentration of PM_{2.5} was studied, and it was found that there was a strong inverse correlation between PM_{2.5} and TC in spring, autumn and winter ($R = -0.66, -0.65$ and -0.80), and a weak positive correlation in summer ($R = 0.33$). By calculating the transport flux of fine particles (TF), it was found that the TF in Beijing was highest in spring with 227 mg/m•s, and in the other three seasons were around 140 mg/m•s. The transport mainly occurred between 14:00 and 18:00 LT. According to the PM_{2.5} concentration, it was found that, except for the spring, the TF in the early stage of pollution was large (summer: 328 mg/m•s, autumn: 280 mg/m•s and winter: 247 mg/m•s), and decreased in the heavy pollution period (summer: 295 mg/m•s, autumn: 243 mg/m•s and winter: 218 mg/m•s). The results of this study indicate that the influence of transportation in southern regions should be paid more attention in the early stage of pollution, while the local emission should be paid more attention in the heavy pollution period.