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Observations of particle extinction, PM_{2.5} mass concentration profile and flux in north China based on mobile lidar technique

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16	HIGHLIGHTS
17	Characteristics of the vertical distribution of fine particles in Beijing were observed.
18	Transport fluxes of Beijing were estimated based on a vehicle-based mobile lidar.
19	Southwest was an important regional transport pathway of Beijing.
20	
21	Abstract
21	
22	Fine particle with diameter <25 um (PM,) have important direct and indirect offects on
23 24	human life and activities. However, the studies of fine particle were limited by the lack of
25	monitoring data obtained with multiple fixed site sampling strategies. Mobile monitoring has
26	provided a means for broad measurement of fine particles. In this research, the potential use of
27	mobile lidar to map the distribution and transport of fine particles was discussed. The spatial and
28	temporal distributions of particle extinction, PM _{2.5} mass concentration and regional transport flux
29	of fine particle in the planetary boundary layer were investigated with the use of vehicle-based
30	mobile lidar and wind field data from north China. Case studies under different pollution levels in Design ware presented to evaluate the contribution of regional transport. A valuable based mobile
31	Beijing were presented to evaluate the contribution of regional transport. A ventile-based mobile
32 33	measurement route. Fixed point lidar and a particulate matter sampler were operated next to each
34	other at the University of Chinese Academy of Science (UCAS) in Beijing to determine the
35	relationship between the particle extinction coefficient and PM_{25} mass concentration. The
36	correlation coefficient (R^2) between the particle extinction coefficient and PM _{2.5} mass
37	concentration was found to be over 0.8 when relative humidity (RH) was less than 90%. A
38	mesoscale meteorological model, the Weather Research and Forecasting (WRF) model, was used

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