# Atmospheric pollution monitoring in Qinhuangdao by employing a scanning lidar system

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The scanning atmospheric lidar technique, which is capable of detecting localized pollutant emissions through near-horizontal 360° panoramic scanning measurements, becomes a popular and powerful tool for atmospheric environmental monitoring and management. Recently, the Scheimpflug lidar technique (SLidar), employing a high power 808-nm laser diode as the light source and an image sensor as the detector, has also been utilized for atmospheric remote sensing. In this work, an 808-nm SLidar system has been utilized for urban pollution monitoring through near horizontal scanning measurements. The SLidar system, deployed on the roof of a tall building, is able to obtain 360° panoramic lidar profiles over several kilometers range during both daytime and nighttime. We have investigated the reliability of the Klett-Fernald method and the slope method for the retrieval of the aerosol extinction coefficient (AEC) in scanning lidar measurements. A modified Douglas-Pucker algorithm has been proposed and evaluated for the determination of the boundary value of extinction coefficient. Meanwhile, an iterative optimization algorithm has been developed to improve the retrieval reliability of the scanning AEC map. Comparison studies with the particulate matter concentrations measured by surrounding environmental monitoring stations have also been pursued during a one-month measurement campaign. The measured extinction coefficient has shown good agreement with the PM10 concentration.