Observation of the boundary layer structure and aerosol properties over Yangtze River Zone using mobile shipboard lidar

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A mobile shipboard lidar system at a wavelength of 532nm and 355nm has been developed and applied to detect the urban air quality. From 21 November 2015 to 3 December 2015, particulate matter (PM) observed with mobile shipboard lidar was carried out in the Yangtze River, China, as a part of Yangtze River Campaign (YRC). Combined with the latitude and longitude information acquired by GPS, the detailed information of the boundary layer structure, the three-dimensional distribution characterizations of aerosol extinction coefficient and depolarization ratio was presented over Yangtze River area. And the aerosol distribution and transportation during different areas of Yangtze River were illustrated based on lidar data, local meteorological data and backward trajectory analysis. The temporal and spatial variations of the atmospheric boundary layer (ABL) was analyzed, the rate of change of the ABL with respect to PM concentration was emphasized on the section of shipping line, and the secondary process during the aerosol transportation, and transport’s contribution to local aerosols was also analyzed, the results indicate that mobile vehicle lidar could detect the atmospheric aerosols and reflect the stereoscopic PM pollutant distribution properties over urban areas of Yangtze River Economic Zone.