



A new method of 2D Air Quality monitoring using a lidar inside an underground railways station

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In order to better characterize the dynamical processes driving the aerosol distribution in its subway network, the RATP performed two experiments at Nation station (RER A) using the innovative EZ AEROSOL LIDARTM system, developed by the LEOSPHERE company in partnership with LSCE laboratory (CEA and CNRS). The performances of this system have enabled to qualitatively survey the aerosol spatial distribution along the 225 m of the platform and within the tunnel up to 360m, pointing out the variability of the aerosol load along the platform during some events, with high spatial (1.5 m) and time resolution (between 1s to 1mn). Such continuous monitoring of the aerosol dynamic highlights the relative influences of particle resuspension, dispersion by the security ventilation means, and inputs from both the passengers and outdoor environment. These results could eventually lead to modeling tools able to better assess both RATP users and employees exposures according to their location and residence time in the station.

Mass conversion retrieval protocol from the lidar signal has been attempted using preliminary calibration by in-situ sensors as a nephelometer and a TEOM for typical traffic conditions during day and night. Results show correlation with TEOM measurements during normal traffic conditions but underline the need for better characterization of the aerosol microphysical properties, and their variability and distribution

under other traffic conditions.